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POWER CANAL PROJECT.

POSITION OF THE VESSEL INTERESTS CLEARLY OUTLINED AT A MEETING OF THE LEGISLATIVE COMMITTEE OF THE LAKE CARRIERS' ASSOCIATION IN BUFFALO—INTERNATIONAL COMMISSION.

Buffalo, April 10—An important meeting of the legislative committee of the Lake Carriers' Association was held here this morning. Among those present were Messrs. W. C. Farrington, E. T. Evans, J. J. H. Brown, M. M. Drake and Edward Smith of Buffalo, A. W. Colton of Toledo, James Corrigan of Cleveland, H. D. Goulder of Cleveland, and C. H. Keep of Buffalo. Mr. Goulder made a careful report of all that had been done in Washington by the committee which had gone there to look after the proposed legislation relating to the power canal at Sault Ste. Marie. He submitted a draft of a bill which is now in the hands of the chairman of the rivers and harbors committee. He stated that the position of the Lake Carriers' Association had not been one of opposition to the power company. They had, however, insisted from start to finish that any bill giving to the power company a right to operate their canal, should contain the most stringent provisions for the protection of the navigation. He thought that the bill which he had submitted contained provisions so stringent that the interests of navigation would not be jeopardized provided one or two changes which had occurred to the committee after leaving Washington were inserted.

The Washington committee in reporting this bill to the legislative committee with their recommendations that it be not opposed desired it distinctly understood that the Lake Carriers' Association had not requested from congress the passage of this or any other bill. They were satisfied with the conditions as they now exist. If, however, the power canal company desired legislation, then such legislation should protect navigation, and the bill in question did, in their opinion, protect navigation adequately. The Washington committee had stated to the rivers and harbors committee in assenting to this bill that they did not undertake to say what the policy of the United States government to the power canal company should be. They had not undertaken to protect either the property rights of the United States or any other rights which it might possess. They had not endeavored to pass upon the question whether the policy of the government should be to make a grant of this kind to the power company, or to pass a mere regulating statute, regulating the operation of the canal, but not granting to the power company a right to divert water from the river into their canal. Such questions as these were not for the Lake Carriers' Association to settle, but for the authorized representatives of the government to deal with. The only points on which the Lake Carriers' Association could properly touch at all were those which affected the shipping. Another question which the Lake Carriers' Association had not attempted to deal with was the policy of proceeding at all with legislation in this matter until after an international commission with full authority to deal with such questions on both sides of the river should be appointed. The question whether there should be special legislation in this case and an international commission afterwards, or whether the international commission should be appointed first, thus making special legislation for this particular canal project unnecessary, was one for congress and not the Lake Carriers' Association to deal with.

The Legislative Committee then took up the proposed bill, as presented by Mr. Goulder, paragraph by paragraph. The first paragraph of the bill was amended by inserting a provision that before water was diverted from the St. Mary's river into the power canal, the consent of Canada thereto should be obtained. One other change in the phraseology was also made, and the full text of the bill, with these changes incorporated, is as follows:

FULL TEXT OF POWER CANAL BILL WITH LAKE CARRIERS' AMENDMENTS.

Be it enacted, etc., that the consent of congress is hereby granted to the Michigan Lake Superior Power Co. of Sault Ste. Marie, Mich., its successors and assigns, the consent of Canada being first obtained, to divert water from the St. Mary's river into its water power canal now being constructed at Sault Ste. Marie, Mich., said company being granted the further right to construct and maintain in and about said canal suitable works, and to do whatever is necessarily incidental to the operation of said canal for water power purposes, upon, however, the express precedent conditions hereinafter mentioned:

Section 1. That coincident with the diverting from the River St. Mary into such canal of any of the waters of said river, such company shall provide or cause to be provided and shall thereafter maintain suitable and sufficient remedial and controlling works in the rapids of the River St. Mary of such a character that such canal and the said controlling and remedial works, and the operation thereof, either in themselves or in conjunction with any other canal or canals or works in the United States or Canada, which now or hereafter may exist, shall not injuriously affect navigation in and shall not impair or diminish the water level or depth of water in and of Lake Superior, or the channels, natural and artificial, which are now or may hereafter be established or created for navigation purposes, or any natural increase thereof, either in Lake Superior or in any connecting waterways, including the ship-canal and locks at Sault Ste. Marie, Mich., and the St. Mary's river.

Section 2. Provided further, that there shall be appointed by the secretary of war, as soon as practicable, a board of five engineers, three of whom shall be officers of the corps of engineers of the United States army and two of whom shall be disinterested, experienced hydraulic engineers from civil life, to whom shall be submitted for their consideration and report the plans of and proposed methods of operating such remedial and controlling works and the plans and methods of operation of any other portions of the works of said company which may affect the navigation or the currents or the water levels of the navigable waters hereinbefore mentioned or of the United States works in connection therewith. Such board may, upon the application of any person interested and upon due

notice to the Michigan Lake Superior Power Co., give a public hearing at such time and place as it may designate. The report of such board shall be made to the secretary of war as soon as practicable and within a reasonable time after the submission of such plans and other data. Such remedial and controlling works shall not be constructed, nor shall such canal be operated until such plans and methods of operation shall have been approved by said board, or a majority thereof, and shall have received the approval of the secretary of war and the chief of engineers, with such minor modifications if any as said secretary and chief of engineers may deem necessary.

Section 3. Provided further, that whenever in the judgment of the secretary of war the operation of said canal and remedial and controlling works, or either of them, either in themselves or in conjunction with any other canal or canals or works in the United States or Canada which now or hereafter may exist, is injuriously affecting or tending to injuriously affect the water levels or the navigation of Lake Superior and the River St. Mary, or other channels connected therewith or public works in that vicinity, the secretary of war shall have the right to impose such rules and regulations as he may deem necessary for the operation of said canal and works to prevent such injury, and he may for that purpose remove said works or any part thereof, or take possession of said canal and works or any part thereof, and control the flow of water in said canal and take such other steps in connection therewith as he may deem necessary to protect the interests of navigation. If at any time he shall cause any of said works, or any part thereof, to be removed, or shall take possession of said canal or works or any part thereof, or interfere with the operation thereof under the authority hereby conferred, he may, upon request of any party in interest, and shall, upon the request of the canal company, either re-appoint the first board herein provided for, or appoint a similar board, to report on the whole subject and recommend such modifications, alterations, additions or devices as in the judgment of said board or a majority thereof, shall be necessary to obviate such actual or threatened injury to navigation, and said company shall forthwith comply with the recommendations of the report of any such board upon the approval thereof by the secretary of war and the chief of engineers.

Section 4. Provided further, that neither the secretary of war nor chief of engineers nor any officer or other person acting under direction of the secretary of war shall be in any way liable for any acts done in the execution of this act.

Section 5. Nothing herein contained shall be construed to impair the existing riparian rights of any other person or corporation nor to prevent the exercise in the future by the United States of any riparian rights it may have.

Section 6. If at any time an international commission shall be duly created to investigate and report upon the maintenance of the levels of navigable waters lying between the United States and Canada and the protection of navigation therein and such commission shall recommend rules or regulations regarding the same, which become operative, the secretary of war may require the canal of said company and all remedial and controlling works connected therewith to be operated, maintained or changed in accordance therewith.

Section 7. In case any litigation arises in relation to said canal and works or growing out of the operation thereof, the case may be tried in the proper court of the United States in the district in which the said canal or any part thereof is situated.

Section 8. That the right to alter, amend or repeal this act is hereby expressly reserved.

After the foregoing bill had been considered, the following resolution was offered by Mr. E. T. Evans and unanimously adopted by the committee:

Resolved, that this committee approves of the work done at Washington by the committee and officers of the Lake Carriers' Association in carrying on the negotiations relating to the power canal project. The committee on legislation approves of the bill as agreed upon only so far as the same relates to the safeguarding of navigation, leaving to the proper committees of congress to protect the property, financial and other interests of the United States by provisions in the bill as finally acted upon by congress. The legislative committee also approves of the suggestion made by Mr. Frank J. Firth of Philadelphia, that a bill for an international commission to take charge of the whole subject of water levels on the great lakes and connecting rivers should be passed by congress without further delay. The officers of the association, together with the committee who visited Washington in the power canal matter, are hereby given authority to act for the association on this subject until fully settled, such authority to include the active support of legislation for an international commission, the officers and sub-committee to report steps taken from time to time to the full legislative committee for approval and confirmation.



A CLEVELAND VESSEL OWNER IN CAIRO.

His friends in America are wondering that the situation was not reversed and that he did not try to walk off with the elephant.

FOR LAKE MICHIGAN SERVICE.

PLANS OF ELEGANT NEW GOODRICH LINE STEAMER—GREAT PAINS TAKEN WITH LIFE-SAVING APPLIANCES—IMPROVEMENTS IN THE CHRISTOPHER COLUMBUS.

Plans for a new screw passenger steamer for the Goodrich Transportation Co. are about completed at the drawing office of the company in Chicago. A glance at the drawings shows that great pains have been taken to provide for the comfort and convenience of passengers in every respect and to make lake travel on the vessel a real pleasure and healthful outing. The appointments and equipment will be magnificent. Principal dimensions of the vessel are: Length over all, 256 feet; length on keel, 238 feet; beam (natural), 40 feet 6 inches; beam over guards, 48 feet; depth from top of keel to cabin deck, 25 feet 3 inches; depth, molded, 16 feet 6 inches; depth of hold, 15 feet 9 inches; draught of water, loaded, 12 feet.

Engine will be of the triple expansion type, with cylinders of 22, 38 and 64 inches diameter and 36 inches stroke. Steam will be furnished by three Scotch boilers, each 11 feet 6 inches in diameter by 12 feet long, and the best system of forced draft will be installed. It is intended to develop a speed of not less than 17 miles an hour. The vessel has been designed for winter as well as summer service and consequently is especially modeled, strengthened and equipped for breaking ice which might be encountered, and she has an unusually large coal bunker capacity. The plans were gotten out for a wooden vessel, as the width of stern and a few other points will show, but it has as well as been decided to build the vessel of steel, and if this is done the change will affect only the scantling plans and not the general arrangement. The letting of the contract only awaits a settlement of the present disturbed labor situation and a return to somewhat lower prices for material, which are expected shortly. The steam heating arrangement of the vessel will extend to every room, so as to provide comfort in cold spring and fall days as well as in winter.

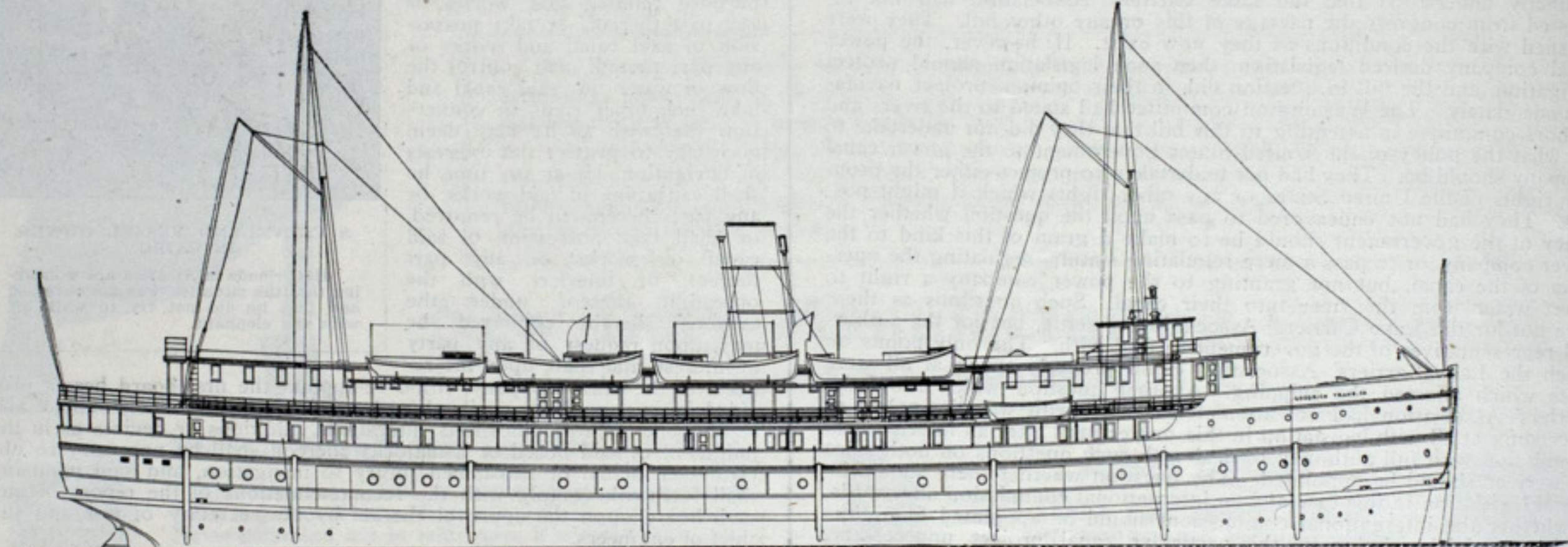
On entering the large vestibule, or social hall, on the main deck the passenger finds the purser's and clerk's office, and steward's and bill

captain's room occupies the space usually allotted to pilot house, but is much larger and consists of a parlor on the starboard side and bedroom on port side. These quarters are entered from the starboard side only, and are comfortably and suitably furnished—desk, sofa, lounge and easy chairs in the parlor and in the bedroom a bureau, washstand, wardrobe, bed, etc.

The pilot house and chart room are above and a little abaft the captain's quarters, or just at the after edge of the bridge and on the forward end of the lifeboat deck. Being so well aloft, the pilot house is away from the deck on which the passengers congregate, and this precludes the possibility of shutting off the pilot's view ahead. He thus has a much better outlook and is free from the pernicious influences of flickering lights at night, often encountered when on the deck below. There are toilet rooms for ladies and gentlemen on the upper deck, in addition to those on the deck below, and they are easily reached at all times, being located in the trunk near the funnel and engine room skylight amidship.

SPECIAL ATTENTION GIVEN TO LIFE-SAVING APPLIANCES.

One very marked improvement over other vessels of the Goodrich line, or, in fact, over any on the lakes, is the very complete (and some might think unnecessary) arrangements made on a large scale for life-saving appliances. On the boats' deck—named so because it is reserved for lifeboats and life rafts—are eight large lifeboats, built after the most approved regulations, which are always right side up. These boats have a capacity for 284 adults, and with two smaller boats for twelve persons each on the deck below, the capacity is increased to 308 persons. The smaller boats always hang on the davits for use in case of an accident or emergency of any kind. In addition to this equipment there are six modern life rafts built for thirty-five adults each, or a total of 210. Thus there are life boats and rafts of the finest kind for the care of 520 persons, and life jackets, floats, etc., are in addition provided for about twice that number. President A. W. Goodrich has spent considerable time and money during the past few years in investigations and experiments relative to the handling of life boats, the design and equipment of the same, and life-saving devices generally, and the Society of Naval



NEW GOODRICH LINE PASSENGER STEAMER FOR LAKE MICHIGAN SERVICE.

clerk's office at the after side of the hall, with their quarters conveniently adjoining their offices, and on the fore side is the parcel or package room. The smoking room and bar is reached from the vestibule by an easy stairway, as it is directly under the social hall. The bar, with its fixtures, will be equal in appointments to that of any first-class hotel. On ascending the grand stairway the cabin deck is reached, on which are located seventy-six staterooms with 160 berths. On the fore part of this deck is an elegantly-finished dining saloon. A well-appointed pantry is immediately forward of the saloon, and directly under the pantry on the deck below is galley arranged and built to take care of a very large number of passengers expeditiously and satisfactorily. On the after end of this deck is the ladies' cabin and music room, with large easy chairs and lounges comfortably and richly upholstered. Directly off this cabin and on the same deck are the ladies' retiring rooms, lavatories and large enamel-finished bath room. These quarters will be finished in polished hardwood and marble and will be mirrored, efficiently lighted and well ventilated. Large rooms for four cabin maids and the clean linen room adjoining are built in the trunk near the engine room skylight amidship. The promenade deck above is reached by easy-grade, large stairways at the after and forward ends of the midship engine trunk, and at the top of those stairways are magnificently decorated vestibules leading out onto a wide promenade all around the ship from stem to stern, about 75 per cent. of it being sheltered from rain or sun by the boats' deck overhead.

UPPER DECK ARRANGEMENTS.

On the promenade deck are fifty-two staterooms with 108 berths. Some of these staterooms are much larger than others. They are furnished as parlors for three or four people and are richly upholstered and harmoniously decorated. These rooms are all well lighted and ventilated, in fact provision has been made for daylight and fresh air in every stateroom on the boat. The hallways leading to the staterooms on this deck are as wide as are to be found in most hotels and will be heavily carpeted. Writing desks with all materials for correspondence are to be found in quiet, convenient corners, and on the outside in various places on the promenade are ice water drinking fountains with silver cups. The

Architects and Marine Engineers, of which he is an associate, has given the subject special consideration at recent meetings. All the life boats will be carried on steel davits, which, when released, fall outboard into position for lowering the boats immediately. They are tackle-borne, thus avoiding the labor and waste of time spent in the old method of swinging the life boats around with the davits, one at a time and steadying and lashing them before lowering away.

Among the fire protection appurtenances will be a system of pipes overhead on the main deck and in the hold. These pipes will have about 100 sprinklers attached to the main deck series and also to the hold series. Each sprinkler has a radius of action of about 8 feet, and when the pumps are started and the controlling valves opened the entire main deck or the hold, together or separately, can be deluged in a few moments. The system of overhead piping is so arranged that water need not flow except in the place where fire is threatened or already exists. The main cabin and the promenade deck and upper works are protected from fire by hydrants that have hose all complete and attached ready for use by a drilled crew, and they will be able seamen, as no deckhands will be allowed on the passenger decks. Chemical fire extinguishers and hand pumps are located all over the vessel in handy places and always in view. The steamer Iowa of the Goodrich line was the first vessel to be equipped with the sprinkling system installed. Nearly every vessel of the fleet now has it more or less complete, and it is periodically tested to see that it is in perfect working order.

Every room on the new vessel will be furnished with one or more 16 candle power incandescent lamps, with a cluster of lights on brackets in each of the larger staterooms. There will be two large dynamos and engines operating a day and night circuit, consisting in the aggregate of 600 lights of 16 candle power each. There will be hot or cold running water in every room at any hour of the day or night, which is one of the conveniences that will be much appreciated on this modern specimen of naval architecture. On the main deck and away from the passenger entrance are located engineers' and oilers' rooms, and rooms for stoker, bartenders, head waiter, porters, waiters, cabin watchmen, etc., and aft over counter of the stern are gentlemen's toilet rooms. Although there is quite a large passengers' valise and package room off the vestibule, there

is also a large space adjoining it, wired off for passengers' trunks and summer tourists' heavy baggage. There are two hydraulic freight elevators, which, although rather uncommon on ships, are not a new thing on the Goodrich line boats.

This new vessel has a very large cargo hold with a watertight bulkhead at each end of it, and one in the middle of the hold with doors in it. In fact, her hull is well divided, there being no less than eight bulkheads and six of that number perfectly watertight. These bulkheads divide the hull into nine compartments. There is a large clear space all along main deck forward of engine room, which is most suitable for handling and stowing package freight.

IMPROVEMENTS IN THE CHRISTOPHER COLUMBUS.

The steamer Christopher Columbus, which will, as usual, be operated as the day boat between Chicago and Milwaukee, will come out early in June. She will be greatly improved this season, as numerous alterations and additions have been made. About the most important change is found in the new toilet rooms for ladies and gentlemen, with entrances on opposite sides of the ship, port and starboard respectively. These spacious mirrored lavatories, with plenty of light and ventilation, are located aft on the promenade (or uppermost) deck and are easily accessible at all times. Attendants are stationed in these places and in the barber shop adjoining, to look after the wants and comfort of passengers. The life boat deck above the promenade has been built right aft to stern, which permits of a change in the location of life boats so as to afford a great deal more sheltered space on that deck for lounging and for promenading. With this additional awning or boat deck, there will be a total sheltered outdoor area of 7,204 square feet, giving a seating capacity for 2,673 people. Passengers and excursion parties, who when traveling prefer to be outside and get the fresh lake breezes, can appreciate what these figures mean as compared with the usual alternative of having to crowd into a warm cabin or main saloon for a seat when tired promenading. Other minor alterations and improvements made on the Columbus are too numerous to mention.

NAVAL AFFAIRS.

The retirements of Rear Admiral McNair, ex-superintendent of the naval academy, and Rear Admiral John A. Howell, president of the naval examining board are expected to take place in a short time. Admiral Howell has already made application for retirement which will be acted upon in a very few days. Admiral McNair has for some time been in ill health and on that account will probably soon apply for retirement. He entered the service in 1853, just one year behind Admiral Dewey, to whom he is next in rank in the navy. During his forty-two years service he has been twenty years at sea and twenty-two years on shore. Since his detachment as superintendent of the naval academy in February last, the admiral has been on leave and would probably have been allowed to continue without orders until his regular retirement next January, but, as above stated, the condition of his health has caused his action in the matter. These two officers are next in rank to Admiral Dewey and their retirement will make Rear Admiral Kautz, commanding the Pacific station, the ranking rear admiral of the navy.

Capt. Silas W. Terry has been appointed a rear admiral vice Rear Admiral Benjamin F. Day, resigned.

KAISER MARIA THERESIA.

The North German Lloyd Co. gave a breakfast recently in honor of the arrival of the company's latest steamship, the Kaiser Maria Theresia. The new steamer is both fast and comfortable. She is the fastest of the line with the exception of the Kaiser Wilhelm der Grosse. The ship is driven by triple expansion engines of 17,000 indicated horse power. The shafting is of nickel steel and the two three-bladed screws of bronze. Thirty-eight auxiliary engines furnish light for the new ship and the power for hoisting and miscellaneous purposes. The first cabin state-rooms, of which there are 113, are amidship, with a large dining room and two smaller rooms forward. The main dining room is decorated in light rococo forms, with walls and ceiling in green tones. The furnishings are red and the carpet ivory. The smaller dining rooms are decorated in light colors and are so arranged as to accommodate small parties that desire seclusion.

The North German Lloyd's service will shortly complete the circuit of the globe, its purchase of steamers for the Pacific having already been announced.

KRUPP'S IMMENSE WORKS.

In a report filed by Consul-General Guenther, at Frankfurt, Germany, he says the total number of people now employed at the Krupp Iron Works is 41,750, of whom 25,133 are at Essen, 3,458 in the Gruson Steel Works of Magdeburg-Buckau, 2,726 in the ship yards at Kiel and 10,344 in various smelters and coal mines owned by Krupp. The firm owns a large number of iron ore mines, among them the Great Bilbao mine in Spain. A railroad owned by Krupp takes the ore from the mine to the seacoast, and from there a line of four Krupp steamships conveys it to Rotterdam. The foundation for these works was laid in 1810 by the grandfather of the present head of the concern. In 1892 the famous Gruson Steel Works were purchased, and three years ago ship building yards were started at Kiel, which, when completed, will give work to 7,000 men.

Walter M. McFarland, twice assistant to Engineer-in-Chief George W. Melville of the United States navy and now acting vice president of the Westinghouse Electric & Manufacturing Co., has a very able article in the April number of the Engineering Magazine on "Limits to the Use of Forced Draft for Marine Boilers." We do not hear much nowadays about boilers being damaged and trial trips lost on account of the use of forced draft, but about ten years ago this was a complaint not at all uncommon. As Mr. McFarland explains, a part of the reason for the change is the increased use of water tube boilers, but it is nevertheless a fact that forced draft can be used within limits on any boiler with decided advantage. Mr. McFarland's article is first a brief history of forced draft and then a discussion of the limits of its use both for naval and mercantile vessels.

THE DOUBLE-TURRET SYSTEM.

The question as to whether the double turret is desirable or undesirable is still being agitated in Washington, and doubtless will continue to be. The naval board of inspection, of which Rear Admiral Frederick Rodgers is president, has submitted an unanimous report to Assistant Secretary of the Navy Allen on the recent trial of the battleship Kearsarge off the Virginia capes. Concerning the turret tests the board says:

"During the afternoon of April 3, the four guns in the forward turret were fired simultaneously at 4,000 yards range, and three of the projectiles apparently fell in the same spot; one fell about 300 yards beyond, but in line. The four guns from the after turret also were fired simultaneously, and in this case three projectiles fell in the same spot; one 8-inch projectile fell to the right. During this test the blast from the 8-inch guns in superimposed turret did not inconvenience the people in the 13-inch turret. Careful observation in the forward turret structure showed the following horizontal deflection of the upper portion of the turret support, the measurements being taken at level of turret roller path and immediately in rear of guns, the fixed point of reference being on the armored barrette. Deflection due to firing simultaneously two 13-inch guns and two 8-inch guns, 7-16 inch; deflection for one 13-inch gun, 5-32-inch; rotation of turrets under this condition, measurements being taken at roller path, 9 inches; deflection for one 8-inch gun, 1-16-inch; rotation of turret under this condition, very slight, but approximately 1/2-inch. After these tests all of the guns of the main and secondary batteries were fired at extreme elevation and at level. No injury was done to the structure of the ship or the gunmounts by these tests except breaking a glass and a bolt."

The board notes that on firing the automatic one-pounders in the military tops the vibration and jump to the mount was so great as to make any further firing of those guns dangerous. The board calls attention to the fact that the vessel was taken from the contractors before she had been thoroughly completed and says that on this account the benefits intended to be attained by the government as the results of a final trial were not forthcoming. It is recommended that the first official trial of a vessel in future be not made until that vessel has been practically completed in all particulars. In conclusion, the board reports that no weakness nor defect in the fittings or equipment due to defective workmanship or materials, etc., appeared except the minor ones noted; that the machinery was in excellent condition and worked well. The speed attained with a mixture of slack and soft coal was 14.99 knots per hour.

Rear Admiral Charles O'Neil, chief of ordnance, makes the following statement as to the Kearsarge's performance. "I did not suppose for a moment that the turret structure or the vessel would prove deficient in any respect, as both have been carefully and conscientiously worked out by the bureau of construction and repair, as have also the various mechanical difficulties which the scheme presented. It will be necessary, however, to determine what will be the result of rapid and prolonged firing, and further tests under varying conditions of weather at sea are desirable. It may be said that it is shown that we may, if we choose, build battleships with respect to their turrets in this manner, but the vital question is, do we want to or is it desirable so to do? There will always be a difference of opinion on this point. The question, therefore, whether or not the system of superimposed turrets should be adopted for the new battleships is by no means easy of solution. It will have to be carefully considered and a consensus of opinion obtained from a number of people whose judgment in such matters represents the best talent in the navy."

Rear Admiral Philip Hichborn, chief of the bureau of construction and repair, says that further tests are necessary. "The test that occurred last week," he said, "demonstrated the structural strength of the superimposed turret. The military efficiency to which this bureau has always taken exception has yet to be demonstrated. One of the disadvantages of the system, it seems to me, arises from the inability to train the guns upon different portions of the ship at the same time. It is a well known fact that in battle there are twenty misses to one hit. By using all four guns simultaneously, it is evident that a tremendous waste of ammunition will occur. Besides, the 13-inch guns are intended for use against the heavy armor and the 8-inch guns against the ends of the ship, the superstructure and other parts protected by light armor. The efficiency of the guns installed in superimposed turrets is less than if they were mounted in separate turrets; the superimposed turret is more vulnerable than independent turrets. If the 13-inch turret were disabled the 8-inch turret would also be thrown out of action, and under rapid-fire conditions the heat and gases in the superimposed turrets would become insufferable."

NAVY WILL PURCHASE THE HOLLAND.

The navy department has finally decided to purchase the submarine torpedo boat Holland. The sum fixed upon is \$160,000 and will be paid for out of the last appropriation bill, which carried \$320,000 for two submarine torpedo boats. For the last three years the utility of the Holland board has been a subject of controversy in the department. The various boards appointed to inspect the boat have reported in favor of it, and Rear Admiral Hichborn has always stoutly maintained that it is a success. Admiral Dewey, too, spoke highly of the boat. The adverse influence was gradually dissipated, and now not only will the Holland be purchased but the navy will lend its influence to the passage of the bill recently introduced by Representative Cummings of New York to purchase several vessels of this type. The adoption of this boat by the United States navy marks an emphatic and far-reaching departure. Already the British government is considering the subject. The first lord of the admiralty, George J. Goschen, recently stated to the house of commons that practical suggestions to meet submarine attack would be valuable.

A representative of the Nova Scotia Steel Co. was in Pittsburg a few days ago to secure bids on the construction of a large steel pier, storage pockets and a lateral railway to reach the mines of the company at Wabana, Bell island, Newfoundland. The Riter-Conley Manufacturing Co., which is filling a \$6,000,000 contract for an affiliated concern, the Dominion Iron & Steel Co., is expected to take a large share of the work. The Pittsburg Commercial Gazette says that it is stated that the Nova Scotia company has contracted with steel concerns of the Pittsburg district to deliver 190,000 tons of ore this year.

SHIP BUILDERS OF BOTH COASTS.

CONTRACTS ON WHICH THEY ARE ENGAGED—REPORTS FROM ALL THE YARDS—
NEW ORDERS—PROGRESS OF THE NEW CONCERNS.

The New York, New Haven & Hartford Co.'s transfer tug No. 13, built by the Bath Iron Works, Bath, Me., arrived in New York a few days ago, having made the run from Maine at an average speed of 15 miles an hour. On the trial off Southport she attained a speed—natural draft and easy steaming—of over 16 miles an hour. This vessel, which is an ideal harbor tug, has the following dimensions: Length, over all, 135 feet; length, load water line, 120 feet; beam, 25 feet 9 inches; depth, 16 feet. She has a very large deck house, and all the crews' accommodation is in this house, none being below deck. The engine is a compound vertical, direct acting, with cylinders of 22 and 48 inches diameter and a stroke of 36 inches. With 125 revolutions and 130 pounds of steam the indicated horse power is 1,250. Steam is supplied by two large steel Scotch boilers, 14 feet 6 inches diameter and 12 feet long, with 168 square feet of grate surface and 500 square feet of heating surface. The vessel has a large pilot house, no spars, two stacks, excellent wrecking and fire appliances, large trimming water tanks, heavy oak rail, massive end and side towing bits, steam steering gear, windlass, electric plant and stockless anchors. Transfer No. 14 will be completed in a few days. These vessels, which are the first tug boats built by the Bath Iron Works, have cost about \$100,000 each.

The award of the two revenue cutters—one for the great lakes and one for the Pacific coast—to the William R. Trigg Co. of Richmond, Va., makes ten vessels for which this company has contracted since the works were opened two years ago. There are now at the works under construction three torpedo boats, two of which have been launched; two torpedo boat destroyers, one cruiser, one submarine boat and the Congo boat. More than 800 men are employed at the works and within the next few months the yards will be extended so as to take in Justis island and afford much greater facilities for the immense amount of work being undertaken. When the enlarged plant is in shape 1,500 men will be given employment. The plant has just been inspected by officers of the revenue cutter service and pronounced a model.

President Henry G. Morse of the New York Ship Building Co., which is building an immense plant at Camden, N. J., has gone to Europe on a business trip. The great buildings at the ship yards are being finished rapidly. The general ship yard building, 1,300 feet long and 600 feet wide, will house most of the machinery. The departments have been so arranged that the progress of the work from the receipt of the raw material to the finishing of the various parts of the ship is invariably towards the ways upon which the vessel will be constructed. Much of the machinery has already been installed and more is arriving daily. It is expected that the company will be ready to execute orders for work in a few months.

E. C. Brewer of Elm Park, Staten island, is building two large dump scows for the Barney Dumping Co. of New York. The scows will be 110 feet in length, 30 feet breadth and 10 feet deep and will have a capacity of 600 yards each. Their frames are of oak and hackmatack, planked with oak and yellow pine and square fastened. Mr. Brewer has almost ready for launching a large harbor tug for the Burlee Dry Dock Co. The hull is 90 feet in length, 20 feet beam and 10 feet 6 inches depth of hold. Her joiner work and engines will be furnished by the Burlee Dry Dock Co. She will be launched about April 15. Mr. Brewer is also planning a balance dry dock 180 feet in length and 80 feet in width.

At the Morgan Iron Works the old whaler Charles H. Hodgdon is being resheathed and recoppered; the steam tug Alma has been generally overhauled; the steamer Elizabeth Van Scriver, owned by the Fergusons, has undergone repairs to her hull and machinery and will later have her upper works remodeled; the steam lighter William Marvel is on the ways with a broken shaft and the tug Woolley is being equipped with a new boiler and machinery.

The steamer Pennsylvania, built at the Roach Ship Yard, Chester, Pa., for the New York, Philadelphia & Norfolk Railway, has beaten the best previous record between Norfolk and Old Point Comfort by eight minutes. The Pennsylvania is 225 feet long, draws 9½ feet of water and is equipped with twin quadruple expansion engines. She is capable of maintaining a speed of 22 miles an hour.

Bids received last week at the Brooklyn navy yard for two 200 horse power boilers and one duplex feed pump for the new electric light plant were as follows: Clonbrock Steam Boiler Co., Brooklyn, N. Y., \$7,045; E. Rutzler, 178 Centre street, New York, \$9,400; the Babcock & Wilcox Co., \$8,495, and the Aultman & Taylor Machinery Co., \$7,964.

The Russian cruiser Variag, which is nearing completion at the Cramp ship yard, Philadelphia, was given a private dock trial last week. The port engine was set in motion and operated satisfactorily. The commission of Russian naval officials under whose direction the warship is being built expressed themselves as pleased with the trial.

The keel of the first of the two mammoth steamships to be built by the Cramps of Philadelphia for the American line was laid last week. These vessels will be among the largest ever constructed in the western hemisphere. They will have 12,000 to 15,000 horse power each and are to be constructed more for comfort than for speed.

At the Burlee Dry Docks & Ship Building Works, Port Richmond, Staten island, two large tug boat hulls are well under way, being nearly closed in, and the keel has been stretched for the first steel freight barge. Two other large steel tugboats are overboard and about ready to receive their engines and boilers.

The 1,700-ton schooner Malcolm Baxter, which was launched from the yards of H. M. Bean at Camden Me., a few days ago, is the sixty-fourth vessel which Mr. Bean has built. She was built for Capt. George Bailey of Manesquam, N. J., and is 230 feet long, 45 feet wide and 21 feet deep.

The Maryland Steel Co., Sparrow's Point, Md., launched on March 28 the new steel steamer Hyades. This steamer is of the following dimensions: Length between perpendiculars, 324 feet; length over all 345 feet; beam, molded, 45 feet; depth, molded at side, 28 feet.

F. M. Isham has decided to revive the ship building industry at Mystic, Conn., by establishing a works there. He is now purchasing and assembling his equipment. Mr. Isham has taken a contract to build for a schooner 143 feet long and 36 feet wide.

On April 14 bids will be received by Mordecai T. Endicott, chief of the bureau of yards and docks, navy department, Washington, for a pumping plant to be installed in connection with dry dock No. 1, Brooklyn navy yard.

The navy department is inviting bids for electrically driven machinery, metal working machinery and machine tools for the Pensacola (Fla.) navy yard. The proposals will be opened on April 10.

The Greenport Basin & Construction Co., Jersey City, has been incorporated with a capital stock of \$75,000 to build ships. The incorporators are C. P. Brigham, F. M. Hoyt and C. L. Flack.

The Morse Dry Dock Co. of New York has practically concluded a contract with the Georgia Lumber Co. for 3,000,000 feet of yellow pine lumber to be used in their immense dry dock.

Ship building yards at Belfast, Me., will build at least three vessels this year—two three-masted schooners in the Gilchrist yard and a four-master in the Pendleton & Carter yard.

Ex-Mayor Amasa Hutchins of Pecatonica, Ill., will cause to be built at Rockford, Ill., a new steamer to accommodate about 600 passengers.

George L. Weldt of Waldoboro, Me., has contracted to build another five-masted schooner of 2,300 gross tons.

ALONG THE PACIFIC COAST.

Capt. H. B. Kirby, whose home twenty years ago was in Detroit, Mich., has developed quite a business in ship building on the Pacific coast. He is operating two yards in Washington, one at Ballard and the other at New Whatcom. At the former place he is completing two very large tugs for the Pacific American Fisheries Co., and it is expected that when these are completed he will undertake the construction of two more steam vessels for the same company.

As an indication of the growth of commerce on the Pacific, it is only necessary to say that the Union Iron Works is building a steamer with a carrying capacity of 15,000 tons for the sugar trade between Honolulu and New York; and that three other vessels of the same capacity are to be added to the fleet.

A great deal of work is being done at Mare island on naval vessels. The hospital ship Solace is undergoing repairs; the cruiser Boston is having all her woodwork taken out to lessen the danger from fire; the army hospital ship Lawton, formerly the Badger, is being fitted out to take the place of the Missouri.

The keel for the new steamboat to ply on the harbor and Chehalis river has just been laid on the Weatherwax slip, Aberdeen, Ore. She will be 95 feet long, 18 feet beam, of light draught and will be ready June 1. She is being built by E. C. Walker of Portland, Ore.

The new steamer Robert Dollar, built at Hoquiam, Wash., by George Hitchins for Robert Dollar, will have her trial trip this week. This steamer is 208 feet in length over all, 38-foot beam and 14 feet depth of hold. She has engines of 650 horse power.

The Pacific Coast Steamship Co. has placed the Senator, formerly a government transport, on the Cape Nome route. The Senator was built in 1898 by the Union Iron Works of San Francisco.

The Union Iron Works, San Francisco, reports that the battleship Wisconsin will not have her trial until the government supplies her turret armor, which will be sometime in July.

Hind, Rolph & Co. of San Francisco are building a new four-masted topsail schooner at Gray's harbor to be known as the Kailau.

A great deal of repair work is being done at the ship yard of Hay & Wright, Oakland, Cal.

BIG COMPANIES ARE HOLDING UP IRON MARKET.

The great consolidations in iron and steel lines are certainly carrying out, these days, the purpose for which they were formed. They are upholding prices. Under the conditions that prevailed before these big industrial organizations were formed, prices of iron and steel, if subjected to the pressure that is now exerted for a reduction, would undoubtedly go down, as it is quite generally admitted that they are much too high, but the answer of the producers to this admission is that a reduction in prices would do no good, but would, on the contrary, certainly have the effect of greatly delaying orders and possibly force the market to an unprofitable basis. The Iron Age says in its latest review of the situation:

"Those whose interests require them to make some decision relative to the probable course of the iron market are in as great perplexity as ever. Nothing has really occurred recently to indicate decisively whether values are more likely to go down than up. Examples of a downward tendency are to be found in finished iron and steel products with the exception of rails, structural shapes and thin sheets, which are firmly held. On the other hand, however, it is reasonably certain that if consumers were to enter the market for large quantities to cover their requirements running some time into the future they would be obliged to pay stiff prices. This is due to a great extent to the changed industrial conditions which now prevail. The great consolidations are now exerting the influence in maintaining prices which was so freely predicted a year or more ago at the time when they were being formed. They seem to be undisturbed by the concessions being made by small establishments competing for the same class of trade. Further, the price of Bessemer pig iron, which may be regarded as the key to the steel situation, remains firm. It was expected that the Bessemer Pig Iron Association would on Saturday last fix prices for the last half of the year, but they took no action. This may or may not be significant, according to the standpoint from which the matter is viewed. It is believed that the makers of Bessemer pig would be satisfied to take orders for the remainder of the year at \$24 at valley furnaces. Billets are also held firmly, notwithstanding the almost total lack of demand. Quite a confident feeling prevails among the large producing interests that all that is needed is patience, and with the passing of the season for labor troubles trade will resume its normal volume."

BRIGHT OUTLOOK ON THE LAKES.

KEY TO THE FREIGHT SITUATION STILL IN THE HANDS OF JOHN D. ROCKEFELLER'S REPRESENTATIVES—OPENING CONDITIONS.

Another week or ten days will certainly have elapsed before all the vessels of the great lakes are in commission. The opening will not, therefore, be regarded as an early opening. The outlook for the season is just as it was in October last when John D. Rockefeller's representatives in the Bessemer Steamship Co. forced the payment of \$1.25 a ton on season contracts for carrying ore from the head of Lake Superior to Lake Erie ports. The key to the whole lake freight situation is still in the office of the Bessemer company. The action of the Rockefeller interests in engaging in October last vessel capacity to the extent of some two and a half million tons more than they seemed to have use for in their ore business has certainly been strengthened by all transactions in lake freight lines since that time. Even today Chicago is paying 3 cents on corn to Buffalo which is better than the contract ore rate from Escanaba, and the latest charters for taking grain from Duluth to Buffalo at the opening have been at rates above the contract figure on ore from the head of Lake Superior.

The uncertain element in the situation is what the Rockefeller interest proposes to do with its surplus vessel capacity. If its operations in ore are in some manner to be so increased as to hold practically all of its vessel capacity in that trade, the shippers who will have grain and coal to move certainly have a difficult problem to meet from the outset. Ships to care for the normal movement of freight in these lines on what are known as wild charters, are certainly not available unless a very large part or all of this surplus Rockefeller capacity is to be placed on the market. A large part of it could undoubtedly be rechartered even now to other shippers for the ore trade from the head of the lakes at \$1.25, but nothing of this kind has been done. This surplus of about 2,500,000 tons in the Bessemer office is just about equal to the addition that will be made to the lake fleet by the combined capacity of new vessels that went into commission late last fall and others that are to be available during the present season. The ship yards are at work on orders for vessels that will carry far more than 2,500,000 tons in a season, but it is hardly necessary to say that only a few of these ships will get in a full season. Some of them may not be ready in time to make even a few trips late in the fall. A general slump in business, especially in iron and steel lines, would of course change the whole scope of conditions that now seem so favorable to the vessels, but as radical disturbances are not thought of, it is quite certain that the season about to open will see a movement of freight larger by 25 per cent than that of any other year in the history of lake navigation. The labor question, as far as the thousands of men on docks are concerned, seems to have been settled. Wages of men aboard the vessels have not been fixed as yet, but as this is not a year for delays in labor matters, the vessel owners will undoubtedly make liberal advances in the schedule of wages that is to be issued within a few days.

About 1,500,000 tons of soft coal to go to Lake Superior ports has been covered by contracts at 50 cents a ton. This is probably something more than a third of the soft coal that will go to all Lake Superior ports. Vessel owners are still demanding higher rates than shippers are willing to pay on coal for Lake Michigan, and as yet probably not more than a quarter of a million tons has been covered by contract for ports on that lake. It is mainly coal for Sheboygan and Manitowoc and the rate is 60 cents. Contracts for Milwaukee delivery extending throughout the season can not be made at less than 75 or possibly 70 cents, but of course this difference between the Sheboygan and Milwaukee rate will not be paid without a great struggle, on account of the disadvantage that would result to the Milwaukee dealers. A large number of vessels loaded at Ohio ports for Milwaukee are to have the going rate on the opening for the first trip, and as one or two boats were chartered within the past day or two at 65 cents it is probable that that rate will prevail on "wild" charters.

AROUND THE GREAT LAKES.

Headquarters of the Great Lakes Towing Co., Cleveland, will soon be moved into the Western Reserve building, which is being enlarged.

Col. G. J. Lydecker, United States engineer, Detroit, will open proposals April 30 for removing boulders, excavating limestone bedrock and dredging in the lower Detroit river.

Another effort will be made to secure from congress funds for a general resurvey of the lakes. Senator McMillan of Michigan has just introduced in the senate a bill with that end in view.

A. G. Blair sends out a notice from Toledo to the effect that he has succeeded to the firm of W. H. Vance & Co., dissolved; that he is the sole owner of all the property and assets of the firm and has assumed and will pay all its liabilities.

Rieboldt, Wolter & Co. of Sturgeon Bay, Wis., have been awarded a contract to build a tug for Mann Bros. of Milwaukee. A steel tug building at Ferrysburg, Mich., for the Sullivan Tug Co. of Detroit, is in the water and will be hurried to completion.

William Marlton, ship builder at Goderich, Ont., has under construction three tugs for delivery at the opening of navigation—one for N. Dymont of Barrie, to be used for towing on the Georgian bay, one for the Dominion Fish Co., and the other for Purvis Bros. of Gore Bay, Ont.

The Green Dredging Co. of Chicago, has been awarded contracts for dredging the following harbors on the east shore of Lake Michigan: Charlevoix, Frankfort, Ludington, Manistee, Grand Haven, Holland, Saugatuck, St. Joseph, Michigan City, Muskegon, South Haven and Portage Lake.

In holding their vessels until there was an urgent demand for them, the Jenks Ship Building Co. of Port Huron undoubtedly turned a nice profit. The steamer Black Rock was sold to R. J. Dunham and others of Chicago, the Linden to the Sandusky Lumber & Box Co., the Runnels to Spence Bros. of Cleveland and the tug Mason to Chas. Maytham of Buffalo.

William Cassel Rhodes is the name selected for the Canadian canal-size steamer launched at the Lorain works of the American Ship Building Co. on Saturday last, for Robert R. Rhodes of Cleveland, and others in-

terested in the Lower Lakes Steamship Co. Mr. Rhodes now directs the affairs of quite a fleet of vessels of this type, which will be available if required for service through the Welland canal and down the St. Lawrence to Montreal.

In its preparations for opposition to the Great Lakes Towing Co., the Maytham Towing & Wrecking Co. of Buffalo has certainly succeeded in gathering into its fleet of some seventeen tugs a few that are of a very good kind. The list includes the G. W. Mason, Schenck, Frank W., Peerless, Sheboygan, Wisconsin, Pete Gorman, Erie, Triton, Nau, Crosby, C. E. Benham, Arthur Woods and three or four others.

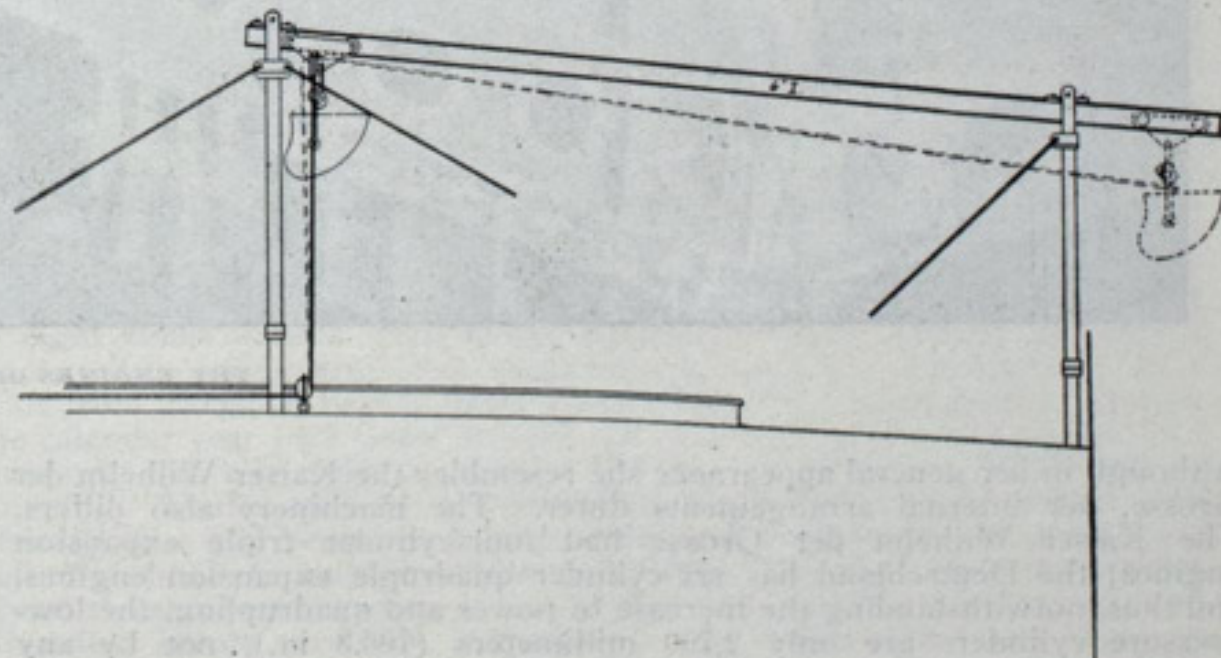
It is expected that the new foundry at the Craig ship yard, Toledo, will be completed in about sixty days. Work on the several steel vessels under way at this yard is progressing favorably. The passenger steamer building for the Arnold Transportation Co. of Mackinaw, Mich., is about one-third completed. This vessel will be ready for sea about June 15. She will be equipped with triple expansion engines and will be very fast. The ocean-going steamer Tampico—Canadian canal size—will be launched within a few weeks.

Although slow in doing so, the Buffalo elevator managers will undoubtedly again enter into a pooling arrangement this season whereby cargoes consigned to crowded elevators may be transferred to houses that have room for the grain, or in other words the facilities of the port will be afforded to the vessels. It would be poor policy on the part of the elevator owners not to enter into such an arrangement this year, as the vessel owners have the upper hand and could enforce, as never before, the bill of lading features regarding shortages and detention that have been talked of for a long time past.

PATENT PORTABLE HOIST.

Capt. C. H. Sinclair of Chicago, well known to the insurance interests as well as the vessel owners, has had years of experience in the work of releasing stranded vessels. Practically his entire life has been spent in this kind of work on the great lakes. Knowing of the great expense that is attached to lightering cargo from stranded vessels, and the advantage that would often be derived from beginning this work at once instead of waiting for a wrecking expedition, he has developed an inexpensive portable hoist that may be carried aboard ship and which can be readily set up for the purpose of lightering cargo in case of accident. The device may also be carried, of course, to great advantage on a wrecking tug, and would prove of value to vessels unloading cargoes of coal, salt, etc., at ports where facilities for the discharge of such cargo is unsatisfactory. Two views of the hoist are presented herewith, the smaller one showing the rig that is placed over the vessel's hatch for the hoisting of cargo, and the larger one the inclined traveler over which the bucket is moved for discharge over the side of the ship. As the telescopic tripod would be of 2 and 2½ inch pipe and the traveler of about 6-inch I beam the device is not a heavy affair and in its various parts would not be cumbersome.

The inclined I beam may be of any desired length, and of one or more sections. This incline is made available, under all conditions, by the use of the telescopic legs or supports and four guys fitted with turn-buckles render the whole apparatus practically rigid. A one-ton bucket is filled below, and by the ship's own deck engine is hoisted to the head of the I beam where its bale engages the patent releasing hook secured



to the traveler. The deck engine then "pays out" and the load travels, of its own volition, down the I beam to the desired point where the bucket is dumped by the one operator, who stands upon a conveniently bracketed scaffold. The bucket is then hauled back to the head of the incline where the patent hook releases the bale and it is lowered again to be filled. The hoist is so made, in fact, that it can be folded up.

In case of the stranding of a coal, ore or salt-laden vessel, the device can readily be set up in a few minutes and fully manned by the ship's crew, and thus the ship may be lightered off in less time than in most cases is required to get the wreckers alongside, and at only a fraction of the cost of the latter. In event of the stranding of a grain-laden vessel all that is required is a satisfactory lighter upon which to discharge, when, upon the release of the stranded vessel, the lightered cargo may be re-loaded by setting up the hoist on the lighter and proceeding as before. In case the cargo is package freight, hooks could, of course, be used instead of the bucket. Capt. Sinclair's address is Royal Insurance building, Chicago.

GREAT ENGINES OF THE DEUTSCHLAND.

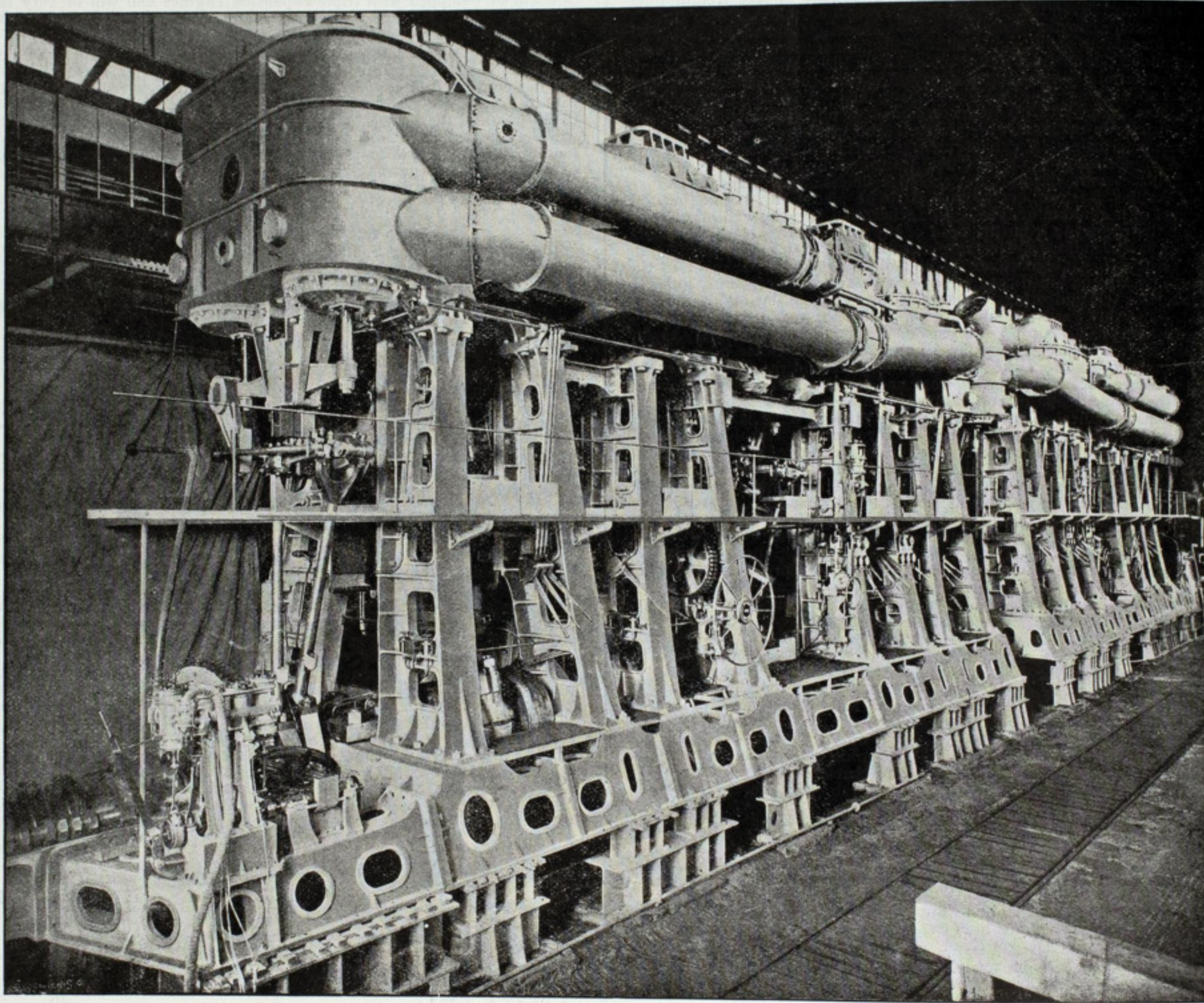
The Hamburg-American liner Deutschland is equipped with engines to develop 33,000 indicated horse power, the greatest power fitted in any ship up to the present time. The fastest of the British-American liners are the Campania and Lucania, which have a displacement tonnage of about 17,000 tons, their length between perpendiculars being 600 feet; the Kaiser Wilhelm der Grosse is 625 feet long and of 19,800 tons displacement; and the Deutschland 662 feet 9 inches long and 23,000 tons displacement. The Deutschland is to leave on her first voyage to New York on June 17 and her performance will be watched with interest.

As shown by the foregoing dimensions of the two vessels the Deutschland is 38 feet longer than the Kaiser Wilhelm der Grosse. Her beam is 67 feet, 1 foot more, and molded depth 44 feet, also 1 foot greater. The gross tonnage is 16,000 and the displacement 23,000 tons.

tem adopted in the Kaiser Wilhelm der Grosse. The diameters of the cylinders are as follow:

Two high-pressure cylinders.....	930 mm. (30.6 in.)
One intermediate-pressure cylinder (I).....	1870 mm. (73.6 in.)
One intermediate-pressure cylinder (II).....	2640 mm. (103.9 in.)
Two low-pressure cylinders.....	2700 mm. (103.3 in.)
Common stroke	1850 mm. (72.8 in.)

Together the engines are to indicate 33,000 horse power when running at about seventy-six revolutions per minute. The cooling surface of the two surface condensers total 3,960 square meters (42,630 square feet). The engraving also shows how the steel bed plate is cut away at the sides to allow the continuous girders under the engines to be as high and as strong as possible, while at the same time the center line of the shaft can be placed lower than would otherwise be the case. The columns are of



THE ENGINES OF THE DEUTSCHLAND.

Although in her general appearance she resembles the Kaiser Wilhelm der Grosse, her internal arrangements differ. The machinery also differs. The Kaiser Wilhelm der Grosse had four-cylinder triple expansion engines; the Deutschland has six-cylinder quadruple expansion engines, and thus, notwithstanding the increase of power and quadrupling, the low-pressure cylinders are only 2,700 millimeters (106.3 in.), not by any means a maximum, as compared with 2,450 millimeters (96.4 in.). The illustration, impressive as it is, does not include the two high-pressure cylinders in each set of engines. They are to be above the low-pressure cylinders and work tandem, and high as is the erecting shop at the Vulcan Works these could not be fitted by the overhead cranes, but their position is indicated by the "beds" cast on the cylinder tops. The two low-pressure cylinders are in the center, with the two high-pressure cylinders over them, and at the forward end is the first intermediate and at the after end is the second intermediate. The two first cranks, set opposite each other, have thus the intermediate in the one case, and a high-pressure and low-pressure cylinder in the other, and the after pair of cranks, a high pressure and low pressure in the one case, and the intermediate on the other crank. The cylinders are placed close together, the valves being on the outside, and there is a separate valve gear for each cylinder—six sets for the six cylinders of each engine. The end cylinders have their valve boxes on the outside, as is shown by the engraving, and owing to the great diameter there are two spindles, a sys-

steel, with the web cut away, where possible, to reduce weight. There are twelve double-ended and four single-ended boilers, divided equally into four sets for four boiler compartments. The engraving is from Engineering.

BOOK NOTICES.

"Sailing Alone Around the World," by Capt. Joshua Slocum, has been running for some time in the Century and is now out in book form. It is the narrative of a cruise of 46,000 miles in the Spray, a sloop 40 feet long, 14 feet 2 inches beam, and 4 feet 4 inches depth of hold. During the trip the author-sailor had many adventures. He fought with the savages of Tierra del Fuego, he visited Robinson Crusoe's island and he spoke the Oregon in her record-breaking run.

The Review is just in receipt of a book entitled "History of the Manufacture of Armor Plate for the United States Navy," compiled by the American Iron and Steel Association of Philadelphia. It is a superbly illustrated volume and reviews the growth and development of armor plate making, the ponderous machinery required and the vicissitudes which have beset the manufacturers. Several illustrations are given of armor tests, and the controversy which has raged in and out of congress over the price of armor plate is faithfully recorded.

SIXTY-ONE MILLIONS FOR THE NAVY.

PROPOSED APPROPRIATION THE LARGEST EVER RECOMMENDED—COST OF NEW SHIPS AUTHORIZED, EXCLUSIVE OF ARMOR AND ARMAMENT, WILL BE TWENTY-EIGHT MILLIONS.

The naval appropriation bill was presented to the house a few days ago with an admirable report upon it by Representative Foss, chairman of the committee on naval affairs. The amount carried by the bill is \$61,209,916.67, the largest ever reported to the house. It exceeds the appropriation of last year by \$13,109,947.09 and is a total increase over all acts of \$7,864,947.09. The increase is due to the improvement of yards and docks, the construction and repair of vessels and the increase of the navy. Following is a statement showing the appropriations carried by the bill and the apportionment to each department:

Pay of the navy.....	\$12,810,897 00
Pay, miscellaneous	500,000 00
Contingent, including emergency.....	520,000 00
Bureau of Navigation.....	566,425 00
Bureau of ordnance.....	2,388,124 00
Bureau of equipment.....	3,464,052 52
Bureau of yards and docks.....	608,439 83
Public works, yards and docks.....	7,797,467 32
Public works, naval academy and observatory..	690,000 00
Bureau of medicine and surgery.....	220,000 00
Bureau of supplies and accounts.....	2,731,232 03
Bureau of construction and repair.....	6,235,824 25
Bureau of steam engineering.....	2,774,200 00
Naval academy	199,685 45
Marine corps	2,712,870 27
Increase of the navy.....	16,990,699 00

Total \$61,209,916 67

The bill provides for the construction of two additional stone dry docks, one at New York and the other at Norfolk, Va. The bill carries an appropriation of \$650,000 for the dry dock at Algiers and \$900,000 for the continuation of work upon the four dry docks now under construction.

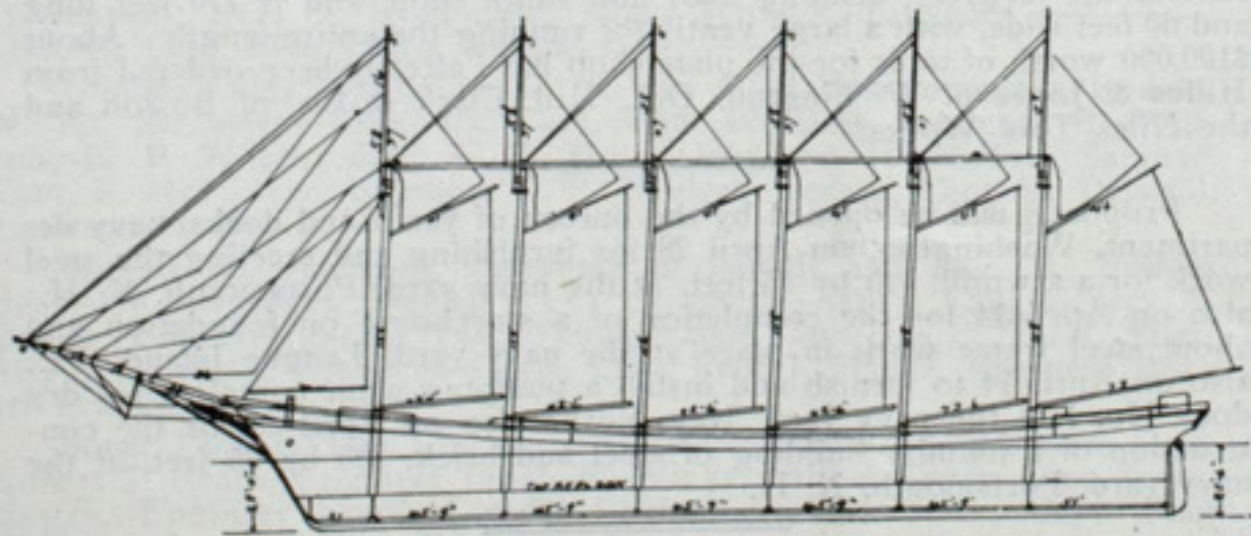
The committee recommends that \$545 be paid for Krupp armor for the Maine, Ohio and Missouri, saying: "The best obtainable armor at the present time is, according to all naval authorities, the so-called Krupp armor, which is, at least, and has been so proven by ballistic tests, of 25 per cent. greater efficiency than that of the Harveyized armor. Your committee believes that it is little short of disloyalty to recommend any other than the best protection and the best armor for these battleships to be placed between the bodies of our officers and men and the bullets of the enemy."

It is also recommended that the three new battleships—Georgia, Pennsylvania and New Jersey—and the armored cruisers West Virginia, Nebraska and California, be equipped with Krupp armor. Upon the naval program the committee says:

"For the purpose of further increasing the naval establishment of the United States the committee recommend that the president be authorized to have built by contract two seagoing coast line battleships, carrying the heaviest armor and most powerful ordnance for vessels of their class upon a trial displacement of about 13,500 tons, and to have the highest practicable speed and great radius of action, and to cost, exclusive of armor and armament, not exceeding \$3,600,000 each; three armored cruisers of about 13,000 tons trial displacement, carrying the heaviest armor and most powerful ordnance for vessels of their class, and to have the highest practicable speed and great radius of action, and to cost, exclusive of armor and armament, not exceeding \$4,250,000 each, and three protected cruisers of about 8,000 tons trial displacement, carrying the most powerful ordnance for vessels of their class, and to have the highest speed compatible with good cruising qualities and great radius of action, and to cost, exclusive of armament, not exceeding \$2,800,000 each. The maximum cost of the ships herein authorized, exclusive of armor and armament, will be \$28,350,000. This is the largest naval program ever submitted by the committee on naval affairs of the house and is in accord with the wishes and recommendations of the secretary of the navy and Admiral Dewey, and will, we believe, meet the just demands of public sentiment. The past year in naval construction has been marked by the most liberal naval programs on the part of all foreign nations."

FIRST SIX-MASTED SCHOONER EVER BUILT.

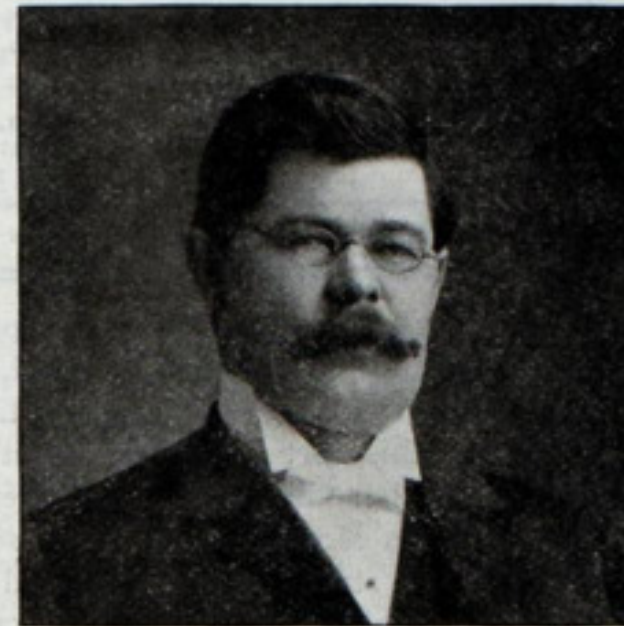
H. M. Bean of Camden, Me., furnishes a drawing which is published herewith of the six-masted wooden schooner which he is building for J. G. Crawley of Taunton, Mass. He says that the vessel has the unique distinction of being the first six-master and the largest in the world. The



keel of the boat was laid on Monday of this week and it is expected that she will be ready to be launched on August 1. Her dimensions will be: Length, 300 feet; beam, 48 feet; depth 22 feet. He has also on the stocks a five-master, keel, 250 feet, beam 46 feet and depth 22 feet, to be launched in September. There was launched from his yards on Saturday last a four-masted schooner, length, 210 feet, beam, 45 feet, and depth 20.8 feet.

D. J. KEEFE.

Since one's birthplace is an accident and one's years of little moment, it is unnecessary to state where D. J. Keefe was born or how old he is. Both are non-essentials in the estimate of the man. Distance is reckoned by time for railways; and years are reckoned by achievements for man. If a man has done nothing, no matter how old he may be, he has not lived at all. Keefe is a big man, both in body and brain, and his distinguishing characteristic is his determination to keep his word. That's the primary impression—the consciousness that what he says will be done—and without waste of words. He goes to the pith of the matter at once and when a thing is settled once it is settled forever.



It was confidence in D. J. Keefe, the president of the International Longshoremen's Union, that caused a speedy settlement recently of time and wage schedules for thousands of workmen employed on Lake Erie docks. The representatives of dock companies that will handle millions of tons of freight on these docks during the season now opening were satisfied at the outset that in this leader of the labor forces they had met with a man who would live up to an agreement and was capable of exerting great influence in having the various unions that he represented do likewise. This was what was wanted. It had been agreed that a trial would be made of direct dealings with organized labor and at marked increases of wages all along the line. But the great fear of the employers was the constant disturbance they had experienced in previous years on account of a lack of responsibility in the labor forces. There was a sense of broadness and capability about Keefe that removed that fear on the very first day of his dealings with the shipping interests. The task of settling wages and hours of labor was therefore almost of a secondary kind. The future of labor unions on the great lakes certainly depends very much upon the test of the coming season. Labor will certainly have scored a great victory if respect for this chief of the federated organizations is maintained throughout the year.

SHALL WE BE A MARITIME POWER?

Following are some extracts from an article in Leslie's Weekly upon the subject "Shall We Be a Maritime Power" from the pen of Eugene T. Chamberlain, commissioner of navigation:

"If we are to accept the experience of successful maritime nations the recasting of the postal subsidy act of 1891 is an immediate necessity to the domestic building of fast ocean steel steamships for foreign trade. Will such a measure be sufficient to create an American merchant marine in foreign trade under the American flag? Unquestionably it will not, for adverse conditions of construction must be considered, as well as adverse conditions of operation already noted. The first and most important of these unfavorable conditions is the fact that Great Britain was never before so far ahead of the United States in the scale on which commercial ship building is conducted in the two countries as today. Two British ship yards, one with an output of 77,501 gross tons, and another with an output of 82,634 gross tons, each built more steel steam vessels during the year just closed than the entire output of steel steam vessels for the year on the whole seaboard of the United States—54,643 gross tons—yet our construction of this description was the largest in our history. When it is further considered that our own product was almost wholly under the protection of the coasting laws, while the British product is almost wholly for foreign trade, the long lead we have to overcome is even more patent.

"Relative cost of material and relative wages and efficiency of labor are not the only elements to be considered in forecasting our future as a ship building nation for the foreign trade. The scale on which the industry is conducted is of even greater importance, though in the last analysis it rests on the other two factors. We can export locomotives, rails and bridges in competition with Great Britain, because our railroad system is eight times greater than Great Britain's. Great Britain can export (i. e. sell to foreigners) steel steamships because she manufactures on a scale from fifteen to twenty times greater than the United States. During the calendar year 1899 Great Britain not only built practically all her own shipping, but also sold to foreign nations, or exported, \$45,000,000 of shipping. Under existing conditions we shall continuously export ship plates, angles and beams on a large scale, not in sporadic instances, long before we begin to build the ships themselves. We shall build the smaller types of merchant steamships for Japan, and possibly for Norway and Germany, before we build and navigate the larger and faster types of mail steamships until we adopt measures similar to those employed by other nations.

"Existing conditions are not inherent and insuperable obstacles to our appearance as a maritime commercial nation. They can be modified by legislation so as to change radically the entire situation. One proposition is to repeal all laws which require vessels in the coasting trade to be built in the United States, which require the officers of American vessels to be citizens, which prescribe a standard of living on shipboard for American seamen and give them a larger degree of personal liberty than is enjoyed by the seamen of any other nation, and a change in the custom by which the crews of American vessels are shipped, as a rule, in the United States. The opposite proposition is to invoke the co-operation of the government in re-establishing American ship building and navigation for the foreign trade, as elaborated in the bill introduced in the present congress by Senator Frye of Maine and Representative Payne of New York. There is no middle ground between these two propositions, and any effort to find one will be trifling with the situation."

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

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Great commanders are oftentimes tempted to contest for political office. The arm of the military service affected, however, is usually the army—witness Washington, Jackson and Grant. The navy is usually free from the hunger for this sort of power. Neither Porter nor Farragut sought the honor. Neither did Dewey last September when he entered New York harbor from Manila—a grim and solitary old man whose simplicity and modesty and strength had endeared a nation to him. The hero of Cavite was given a reception the like of which the world has never seen. Neither Alexander, nor Cæsar, nor Napoleon was ever the center of such a setting. An empire went into review up the East River to the tomb of Grant before this simple old man. The splendor of it all was his. If at that time his head had become turned no one in the wide world would have blamed him. But Dewey took it, as he took the first of May—with absolute composure—and the American people who love modesty in achievement above all things else took him into their arms and hugged him. But reactions must come. The pendulum must swing the other way. The sober business of the day had to be done, and Dewey, safely ensconced in the niche of fame, was partly forgotten. He came rather cruelly to the view in one or two little acts, which, though justifiable, offended a great many people. But the nation did not forget the hero of Manila bay. No matter what condition may arise there is credit always for that. The announcement of Dewey's candidacy for the presidency caused a great revulsion of feeling to set in throughout the country. American emotion is always highest at the start. Its birth is always in full bloom, but whether it be flower or weed it withers rapidly. In a little while people will recognize generally that it is not such an awful thing for Dewey to declare his candidacy for the presidency of the United States. It is a worthy and most honorable ambition. He has a perfect right to be a candidate for president of the United States if he wants to be. Of course it is generally agreed that he will not come within gunshot of getting the nomination of either party—and a 13-inch gun at that. But this nation is not going to forget the courage that risked death and the battle that made another navy and another empire. The battle of Manila was not a great battle but it was portentous in results. The people will ask no questions about that affair—whether the Spanish vessels had steam up or no, whether they had the complement of guns assigned to them or whether they were deficient in powder and shot. The man was told to do something and he did it.

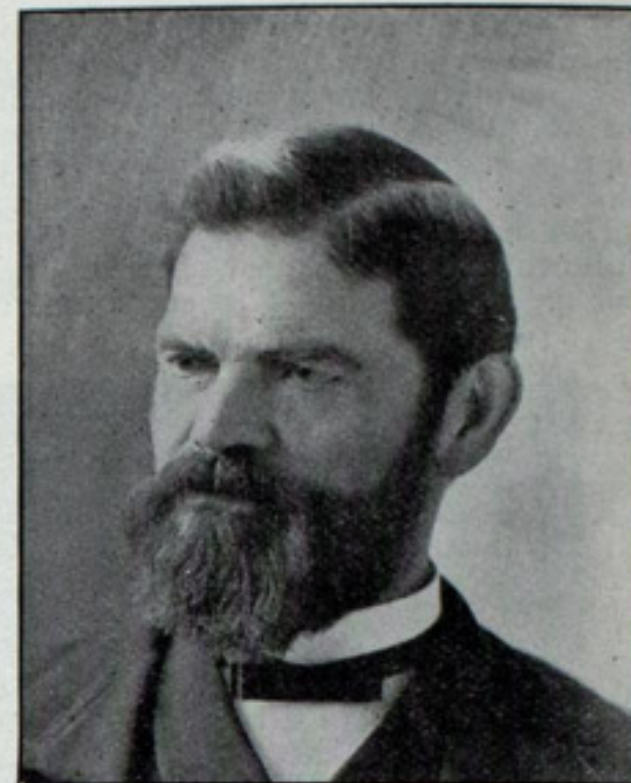
To double turret or not to double turret—that is the question. The recent test of the Kearsarge's battery demonstrated the structural practicability of the system, but the chief constructor and the chief of ordnance both insist that the structural problem was never in doubt. Therefore the recent test has demonstrated nothing. The overshadowing question is the practicability of the double-turret system in action, and Chief Constructor Hichborn who is the foremost unbeliever is just as firm in the faith as ever. Nothing but the unforeseen contingencies of actual conflict will ever demonstrate the worth or uselessness of the superimposed structure. To a layman it seems quite clear that the risk of the double system is a fearful one; that the chance of hitting the enemy with concentrated fire does not compensate for the danger of a crippled turret; that a battleship equipped with double turrets is not as resourceful a fighting machine as one independently equipped. It cannot deliver as many blows in as many places. One shot from a 12-inch gun may not have the force of two twelves and two eights but like Mercutio's wound 'tis enough. The issue is quite pertinent as the arrangement of batteries for the three battleships and three armored cruisers is subject to amendment.

The committee of rivers and harbors, of which Representative Burton of Cleveland is chairman, has decided to take an extended trip up the lakes after congress adjourns. It is now several years since a congressional committee visited the lakes. The result of that trip was far reaching, as it gave to congress the visible evidence of the immensity of lake interests. Since then lake traffic has exceeded even the fondest dreams and doubtless the forthcoming trip will have an important bearing upon future legislation for the benefit of the chain of lakes. All the principal ports will be visited and the party will start upon the trip about the first of July.

Ships will soon be moving on the great lakes and many of the Marine Review subscribers will want addresses changed to the marine postoffice at Detroit or the canal office at the Sault. Notify us in time.

VALENTINE FRIES.

In the death of Valentine Fries one of the most unique spirits ever associated with the development of lake traffic departed. Valentine Fries was no ordinary man, and while he became a vessel owner and a vessel builder under compulsion he did much for the lakes. He located at Milan, O., in 1847 and went into mercantile business. At that time Merry & Gay were building ships at Milan. They issued their orders to Fries to such an extent that he finally had to take one of their boats in payment. Later the firm failed and Fries had to take a second boat to liquidate the account. Shortly thereafter he began building vessels for himself. He built the Atmosphere, Amaranth, William Shupe, William Edwards, Marion W. Page, Charles Foster and Golden Age. The Golden Age was the last boat he built at Fries' Landing, and there is quite an incident associated with her launching. After she was launched it was found that there was not enough water in the river to float her to the lake. Fries was in a quandary as to how he would ever get the boat to the lake. To dredge the stream would cost almost more than the boat was worth. Nature came to his relief with one of the most violent spring freshets Ohio has ever known. In fact the river at Huron has never been as high since the Golden Age was floated down. In those days boats of light draught used to load grain for Buffalo at Fries' Landing.



Mr. Fries early foresaw the development of lake craft. He was a large owner in the Ship Owners' dry dock at Cleveland, and it was through his persistent urging that the second dock was built upon a large scale and the first dock reconstructed to conform to it. He was one of the first to realize that the lakes would some day float craft of ocean size. He was also a heavy stockholder in the large ship yard and dry dock at Lorain. He advocated a broad policy in the planning of the Lorain works. Mr. Fries continued in active business up to the time of his death. He lived at Shinrock, near Milan, where he pursued the avocation of farming. It was often difficult to induce him to leave the farm for even a day or two to take up matters relative to his vessel property and other interests in Cleveland. His investments were numerous. His real holdings in Huron were extensive. When the bank at Huron failed, some years ago, Mr. Fries learned that a number of poor people were depositors and were likely to lose their savings. He acquired the entire property, put it upon a solvent basis and so managed it that no one lost a cent. The boats which Mr. Fries owned at the time of his death were the William Edwards and the Golden Age. He had recently sold some of his vessel property. He was, however, a stockholder in the American Ship Building Co. He was seventy-five years old. He leaves a widow and a child nine years old.

BIG CARGO SHIPS—NEW YARD AT NEW LONDON.

The vessels which the Eastern Ship Building Co. of New London, Conn., is now designing for the Pacific trade (said to be for James J. Hill, will be the largest passenger and cargo steamships in the world. They are to be about 650 feet long, 73 feet wide and 56 feet deep, and will have a displacement of 34,000 tons. As high speed is not desired they will be designed to make not more than 12 knots at sea, but will be capable of a speed of about 14 knots loaded in smooth water under forced draft. They will have quadruple expansion engines and water-tube boilers. About 6000 tons of hull plates and between 500 and 600 tons of boiler steel will be required for each of these steamers.

The new company has fitted up a large drawing office, 75 feet long and 30 feet wide, on the top floor of the Neptune building, New London, near the railroad depot and Groton ferry, and a large force of draughtsmen are already at work upon the plans for the steamers. A contract for the construction of three buildings at a cost of about \$40,000 has been awarded to Asa O. Goddard of New London, Conn. The plate shop is to be a one-story building, 240 feet long and 80 feet wide, open on one side and protected by an overhanging weather shield. The skylight runs for a length of 160 feet in the center of the building. The mold loft is in a building with the joiner and carpenter shop, and this two-story structure is 250 feet long and 70 feet wide. The third building is to enclose the furnaces, bending floor and smith shop, and is 170 feet long and 60 feet wide, with a large ventilator running the entire length. About \$100,000 worth of tools for the plate shop have already been ordered from Hilles & Jones of Wilmington, Del., Hill, Clark & Co. of Boston and the Niles Tool Works.

Proposals will be opened by the bureau of yards and docks, navy department, Washington, on April 28 for furnishing and erecting the steel work for a sawmill, 145 by 45 feet, at the navy yard, Portsmouth, N. H.; also on April 14 for the completion of a storehouse on foundation and about steel frame work in place at the navy yard, League Island, Pa.; also on April 14 to furnish and install a pumping plant complete for dry dock No. 1 at the navy yard, New York; also on April 28 for the construction of a foundry building of steel and brick, 205 by 65 feet, at the navy yard, Portsmouth, N. H.

A Berlin press dispatch says that at a recent conference of German ship builders in Hamburg it was decided to protest against the abrogation of the exemption from duty of ship building materials adopted by the budget committee of the reichstag. Russia, it is said, is making special efforts to increase her shipping, and will give free trade in ship building materials and pay bounties for the establishment of navigation schools.

MASTERS AND ENGINEERS.

APPOINTMENTS OF OFFICERS FOR SHIPS OF THE GREAT LAKES,
SEASON OF 1900.

Booth, A., Packing Co., Chicago: Steamers—S. B. Barker, Capt. Duncan Clow, Engineer Freeman Briggs; F. R. Anderson, Capt. Thomas Hadland, Engineer A. Scott; T. H. Camp, Capt. John Anderson, Engineer George McNeal; Duchess, Capt. William Wood, Engineer William Goodwin; Louisa, Capt. David Wood, Engineer W. Hendrick; Sea Wing, Capt. Oscar Cornelius, Engineer Charles Mason; Harrow, Capt. A. Valier, Engineer Thomas Mahoney; Hiram R. Dixon, Capt. J. F. Hecht, Engineer James E. Evans; Hunter, Capt. E. S. Smith, Engineer George Belloir; Valiant, Capt. D. F. McCauley, Engineer F. C. Rick; Peter Coates, Capt. J. Casey, Engineer F. Burgess; William Maxwell, Capt. J. A. Dahlmer, Engineer George Collison; Liberty, Capt. Benjamin Lewis, Engineer James Kelly; E. W. Endress, Capt. W. B. McLean, Engineer Frank Cater; E. M. B. A., Capt. H. Troden, Engineer —.

Hines, Edward, Lumber Co., Chicago: Steamers—Santa Maria, Capt. W. D. Hamilton, Engineer J. E. Padden; S. S. Wilhelm, William Roach, Engineer —; Cormorant, Capt. John Milne, Engineer A. W. Carlisle; Oscoda, Capt. William Disher, Engineer Frank Nold; Louis Pahlow, Capt. Samuel McCann, Engineer W. A. Eddy. Schooners—Wayne, Capt. Eli Jacques; S. E. Marvin, Capt. C. K. Moore; Galatea, Capt. Alfred Germain; Nirvana, Capt. Lars Madsen; Norris, Capt. Edward Biddlecomb; Ida Corning, Capt. Peter Edgar; D. L. Filer, Capt. Horace Acres; Delta, Capt. John Bates; City of Chicago, Capt. Fred Anderson.

Ogdensburg Coal & Towing Co., Ogdensburg, N. Y.: Steamers—Geo. D. Seymour, Capt. Geo. P. Clifford, Engineer W. W. Reilly, Meyra, Capt. James Martin, Engineer N. T. Jento. Barges—Witbeck, Capt. Justin Mallette, Sr.; Menominee, Capt. Timothy Hunt; Stephenson, Capt. Adolor Demero; Carney, Capt. James Brackin; Hammond, Capt. O. C. Wilcox; Hoboken, Capt. Edward Maloney; H. B., Capt. Michael Rodrique; Ireland, Capt. Louis Sova; England, Capt. Justin Mallette, Jr.; Buckley, Capt. N. Lalonde; Aid, Capt. Philip Theverge; Argo, Capt. Henry Newhouse.

Pittsburg Steamship Co. (Carnegie interest), Cleveland: Steamers—Joliet, Capt. Chas. Hinslea; Wawatam, Capt. Benson Fox; Griffin, Capt. Henry Peterson; La Salle, Capt. Wm. Ames; C. A. Black, Capt. W. B. McGregor; W. R. Lynn, Capt. C. Z. Montague. Schooner—Carrington, Capt. Geo. Pierce. Other masters engaged by this company, and who are to sail vessels now under construction, are: Robert Jones, Frank C. Rae, F. A. Bailey, E. T. Rattray, Samuel E. Lewis. Captain Lewis will sail the steel barge building at So. Chicago. The chief engineer of this line is F. B. Smith.

Calbick, J. A. & Co., Chicago: Steamers—Oregon, Capt. P. Larsen, Engineer Geo. Ingham; James H. Prentice, Capt. R. T. Evans, Engineer F. R. Winkle; Kalkaska, Capt. H. S. Shackett, Engineer Ed. Jubenville. Schooners—R. L. Fryer, Capt. Emil Christen; Oak Leaf, Capt. A. Hansen; Middlesex, Capt. Paul Weimer; Halsted, Capt. John Lundberg, S. H. Foster, Capt. Jas. Curran.

Canada Atlantic Transit Co., Geo. J. Harris, general western agent, Chicago: Steamers—Geo. N. Orr, Capt. Wm. Baxter, Engineer A. W. Wilcox; Arthur Orr, Capt. John Massey, Engineer J. T. Goulding; Kearsarge, Capt. J. McDowell, Engineer L. Sebastian; Wm. H. Gratwick, Capt. Jas. Hullivan, Engineer D. J. Lewis; Ottawa, Capt. Alex. Birnie, Engineer G. F. Booth.

Sullivan, L. S., Toledo: Steamer—David W. Rust, Capt. William J. Leaver, Engineer L. F. De May. Schooners—C. C. Barnes, Capt. Daniel Benson; Chicago Board of Trade, Capt. George R. Bonnah; George G. Houghton, Capt. E. H. Van Dusen; John Schuette, Capt. James Robinson; H. H. Badger, Capt. William Bonnah; Maumee Valley, Capt. H. Scanlen.

Prindiville, John, Manager, Chicago: Steamers—Jesse Spalding, Capt. James Travis, Engineer Fred Otto; Charles Hebard, Capt. George Ryan, Engineer William Schumaker; Niko, Capt. Thomas Beggs, Engineer Luke Manion. Schooners—Annabel Wilson, Capt. W. A. Edgar; Aloha, Capt. W. McCarter; Annie M. Peterson, Capt. Charles Bough.

Graham & Morton Transportation Co., Chicago: Steamers—City of Chicago, Capt. William J. Russell, Engineer William J. McLure; City of Milwaukee, Capt. John Stewart, Engineer Charles L. Barron; City of Louisville, Capt. Donald McDonald, Engineer Byron Burman; Mary, Capt. William A. Boswell, Engineer W. F. Johnson.

Owen, Geo., Ashtabula, O.: Steamers—Janie E. Smith, Capt. F. E. Nettleton, Engineer Henry Hess; Jennie Hoyes, Capt. D. W. Nettleton, Engineer Wm. Grow; L. W. Knapp, Capt. Alvah Snell, Engineer Peter Rasmussen; Neal H. Dow, Capt. James Scribner, Engineer —; Osceola, Capt. Chas. Owen, Engineer —.

Lehigh Valley Trans. Co., L. H. Van Allen, superintendent, Buffalo, N. Y.: Steamers—Tuscarora, Capt. Wm. Williams, Engineer H. Willson; E. P. Wilbur, Capt. C. E. Fuller, Engineer H. Mellon; Saranac, Capt. P. McFarlane, Engineer C. R. Plodeck; Seneca, Capt. D. Driscoll, Engineer D. Fox.

McFall, E., managing, Sandusky & Islands and Erie & Buffalo steamship companies, Sandusky, O.: Steamers—Arrow, Capt. George A. Brown, Engineer Jacob Weis; Pennsylvania, Capt. Harry Tyrie, Engineer J. P. Wells; American Eagle, Capt. Fred J. Magee, Engineer Robert Scheile.

Soper Lumber Co., Chicago: Steamers—James H. Prentice, Capt. Robert T. Evans, Engineer Frank R. Winkel; Albert Soper, Capt. James Hogan, Engineer Frank Costello. Schooners—Middlesex, Capt. Paul Weimer; Halstead, Capt. John Lundberg.

Mitchell & Rowland Lumber Co., Toledo, O.: Steamer—Sachem, Capt. Thomas Ledden, Engineer John Maher. Schooners—George B. Owen, Capt. H. R. Moore; Abram Smith, Capt. H. D. Ray; City of Toledo, Capt. John Griffin.

Kelly Island Lime & Transport Co., Cleveland: Steamers—A. Y. Gowen, Capt. C. Smith, Engineer C. C. Smith; Isabella J. Boyce, Capt.

C. A. Benham, Engineer Geo. Moore; Desmond, Capt. Alfred Dixon, Engineer —.

Hart Steamboat Line, Green Bay, Wis.: Steamers—Fannie C. Hart, Capt. H. W. Hart, Engineer Chas. Dennis; Eugene C. Hart, Capt. C. B. Hart, Engineer Geo. Coulter; C. W. Moore, Capt. —, Engineer Jules Schran.

Teagan Bros., Detroit: Steamers—H. S. Pickands, Capt. J. B. Maddock, Engineer James Bennett; Chauncey Hurlbut, Capt. Joseph Parsons, Engineer William Westbrook. Schooner—D. K. Clint, Capt. Bert Peltier.

Red Star Line, Buffalo, N. Y.: Steamers—Cuba, Capt. Robert Young, Engineer Henry Forrest; Wyoming, Capt. I. G. McLean, Engineer G. M. Bohnert; Robert Mills, Capt. Philip Broderick, Engineer Wm. Skelton.

Hurley, T., Detroit: Steamer—Majestic, Capt. M. G. McIntosh, Engineer F. F. Sherwood. Schooners—Reuben Doud, Capt. Henry Estell; Mystic Star, Capt. J. H. Glass; Monguagon, Capt. F. X. Lennon.

Toledo & Lake Erie Sand Co., R. E. Doville, secretary, Toledo, O.: Steamers—Ella G., Capt. D. F. Doville, Engineer Hugh Passono; Commerce, Capt. Daniel R. Lynn, Engineer James Jones.

Young Trans. Co., W. D. Young, Mgr., Bay City, Mich.: Steamer—Arizona, Capt. Jos. Souss, Engineer —. Schooners—Scotia, Capt. Walter Hazen; Plymouth, Capt. N. Bennett.

Pierce, Wm. E., W. Bay City, Mich.: Steamer—Benton, Capt. Wm. E. Pierce, Engineer C. P. Hagadon. Schooners—Harvey Bissell, Capt. H. A. Pierce; Unadilla, Capt. Hepburn.

Shannon, Joseph, Saginaw, Mich.: Steamer—Wyoming, Capt. C. E. Garey, Engineer —. Schooners—Exile, Capt. J. W. Hall; Wm. Crosthwaite, Capt. O. A. Thompson.

Sandusky Lumber & Box Co., Sandusky, O.: Steamer—Linden, Capt. H. W. Larrabee, Engineer Peter Mullin. Schooner—Charles Wall, Capt. Harry May.

Garey, J. C., Saginaw, Mich.: Steamer—W. P. Thew, Capt. J. C. Garey, Engineer L. Van Liew. Schooner—Monticello, Capt. Robt. Rabideau.

Hahn, J. N., Mgr., Cleveland: Steamers—James H. Shrigley, Capt. Ben Tripp, Engineer John Skelly. Schooner—Shawnee, Capt. W. E. Moore.

Houghton, H., Detroit: Steamers—H. Houghton, Capt. William G. Deeg, Engineer —; Mary, Capt. J. M. Edson, Engineer Joseph Bent.

Nipigon Transit Co., Port Huron, Mich.: Steamer—J. C. Ford, Capt. L. Morrison, Engineer Robert Dornan.

Nagle, John P., Toledo: Steamer—Aztec, Capt. Mattison, Engineer —. Schooner—Miztec, Capt. Smith.

Ragan, W. D., Port Huron, Mich.: Schooners—Eureka, Capt. Frank Dana; Jupiter, Capt. —.

Green, John, Buffalo: Steamer—Lewiston, Capt. Samuel Thurston, Engineer James Green.

Sylvester Bros., Toronto, Ont.: Schooner—St. Louis, Capt. Geo. Williams.

TRADE NOTES.

New York offices of the Chicago Pneumatic Tool Co. will be moved about April 15 from 122 Liberty street to 95 Liberty street.

Capt. James J. Meyler, United States engineer at Los Angeles, Cal., advertises elsewhere in this issue for proposals for continuing the construction of the breakwater at San Pedro.

Mr. Geo. A. Barden, formerly superintendent of the works of the Standard Pneumatic Tool Co., Chicago, has been appointed eastern agent with headquarters at No. 619 Washington Life building, New York.

The Cleveland Punch & Shear Works Co., of Cleveland, has just issued a four-page catalogue of the Cleveland radial drill. The machine is designed for drilling, countersinking and reaming holes in plates, angles and girders and is especially valuable in general bridge and architectural iron work. It can also be used to advantage in any machine shop.

The Williams & Rodgers Co., Superior and Seneca streets, Cleveland, make a specialty of fitting out boats with carpets, curtains, rugs, furniture, bedding and table linen and all other furnishings used in cabins. Vessels making the port of Cleveland will find a distinct advantage in trading with this firm, as they are operating one of the largest retail stores in the city and can attend to the wants of the crew as well as of the vessel itself.

Sterling, Welch & Co., 12 and 14 Euclid avenue, Cleveland, report that their boat trade, always large, has started out this year in a manner that promises to eclipse all previous years. They have already had a number of orders for the complete fitting out of passenger steamers and large yachts with carpets, curtains, cushions, and general upholstery. Their stock is large and their employees thoroughly used to the peculiarities of boat work, so that they may be relied upon to intelligently and accurately fill all orders entrusted to them.

One of the most attractive catalogues which has come to our notice is that of the Ball Bearing Co. of Boston, manufacturers of ball and roller bearings for all kinds of machine construction. The flexible cover is particularly unique in that it contains an oval photograph of a little girl baby. The photograph shows that the child is a particularly healthy one and has grown greatly during the year. The growth of the company is commensurate with the growth of the child. The catalogue is bound in silk cord and is well illustrated with half tones of improved thrust collar bearings, motor vehicle axles and samples of cups and cones.

A catalogue from the Olds Motor Works of Detroit announces the fact that their new plant, with 110,000 feet floor space, located on the south side of Jefferson avenue, near Belle Isle bridge, is now in operation. Three hundred men are employed at these works. The plant at Lansing has been greatly added to and now has a capacity of nearly 1,500 gas and gasoline engines. This concern manufactures the Olds patented gas and gasoline engines, stationary and marine, and also motor carriages and trucks. The catalogue is beautifully illustrated with half tones of their works, both at Detroit and Lansing, and of their output.

"PERFECTION" AIR GOODS.

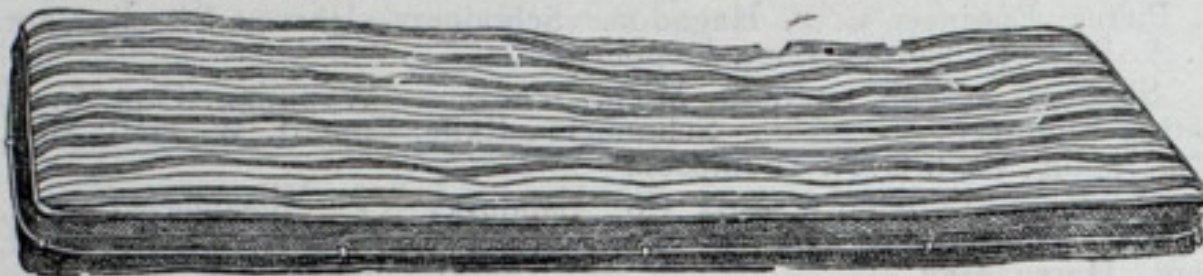
The "Perfection" air mattresses, cushions and pillows manufactured by the Mechanical Fabric Co. of Providence, R. I., are coming into quite general use in the United States navy and its auxiliary branches. The torpedo boats Shubrick, Stockton and Thornton, built by the William



R. Trigg Co. of Richmond, Va., are equipped with these goods, and the company is now engaged in making mattresses for the torpedo boat destroyers which are under construction at the Maryland

Steel Co.'s works at Sparrow's Point, Md. The advantages of this style of mattress are manifold. Indeed the "blown up" mattress is the mattress of the future. It is absolutely odorless, perfectly clean from its very nature, and aside from its quality of comfort, which in itself is enough to establish it in favor, it is the only hygienic mattress on the market. The "Perfection" air goods are made of a strong cotton duck, coated with a pure rubber compound, vulcanized. The outer covering—tickings, leathers, corduroys or velvets—are of the best qualities and the workmanship of the highest.

The "Perfection" air mattress with ordinary care will last a lifetime. It can be inflated to the degree of elasticity desired, and when once inflated requires only occasional attention thereafter. The International Navigation Co. equipped the steamers St. Louis and St. Paul with these



mattresses five years ago, and they have proven so satisfactory that the company has just placed an order for the equipment of two more steamers now being built.

The sanitary qualities of the air mattress have so commended themselves to the United States marine hospital officials that they have been generally adopted for the marine hospital service. For ships, yachts and boats the air mattress is invaluable, owing to its moisture resisting, non-absorbent quality. It is the only genuinely vermin proof mattress. Not the least of its advantages for pleasure craft is the fact that the air mattress is practically a life-saving raft. A life line extends all around the edge of each mattress and cushion. The smallest cushion will save one from drowning and a mattress will sustain as many as can get around it. The Mechanical Fabric Co. makes mattresses to fit any size or shape of berth. They also make cushions to fit any kind of chair or seat for use on ships, yachts, rowboats or canoes. The great advantage of this mattress is that when deflated it takes up very little room. The camp mattress when deflated can be carried in a grip sack. The Mechanical Fabric Co.

are large manufacturers of India rubber goods, and will send an illustrated catalogue upon request.

RISDON IRON WORKS TO BUILD SHIPS.

The following letter from the Risdon Iron & Locomotive Works, San Francisco, Cal., is self explanatory:

Editor Marine Review:—In reply to your favor of March 28, desire to say we have just purchased the property of the Pacific Rolling Mills, which includes thirty-five acres of ground and 1,700 feet of water front, together with machine shops, rolling mills, steel works and everything that belongs to the rolling mills. We are now overhauling the bar iron mills with a view of turning out merchantable bar iron within the next sixty days, and hope, when started, to make about 400 tons per month. As soon as possible we will move our present boiler shop and molding department to the new site and will enter into competition for any new steamers that may be wanted.

We are at present triple-expanding the steamships Mariposa and Alameda of the Oceanic Steamship Co. The new engines for these vessels will have cylinders of 29, 47 and 78 inches diameter, with a common stroke of 51 inches. Each vessel will have two double-ended and one single-ended boiler, the former of 15 feet 3 inches diameter and 17 feet 3 inches length and the latter of 14 feet diameter and 9 feet 9 inches length. These boilers are almost completed and are the heaviest ever constructed on this coast, their shells being 1 1/4 inches in thickness. Both of these steamships will be taken to Risdon's new ship yard and there thoroughly overhauled previous to the installation of their new machinery.

Orders for new tools for ship building, boiler work and foundry equipment will be placed immediately, and within a few months the Risdon works will be operating a large force of men at the rolling mills' site. In addition to our present specialties, a new department for structural iron work has been added, and hereafter the Risdon will make a strong bid for all structural work needed on the Pacific coast and in the Hawaiian islands

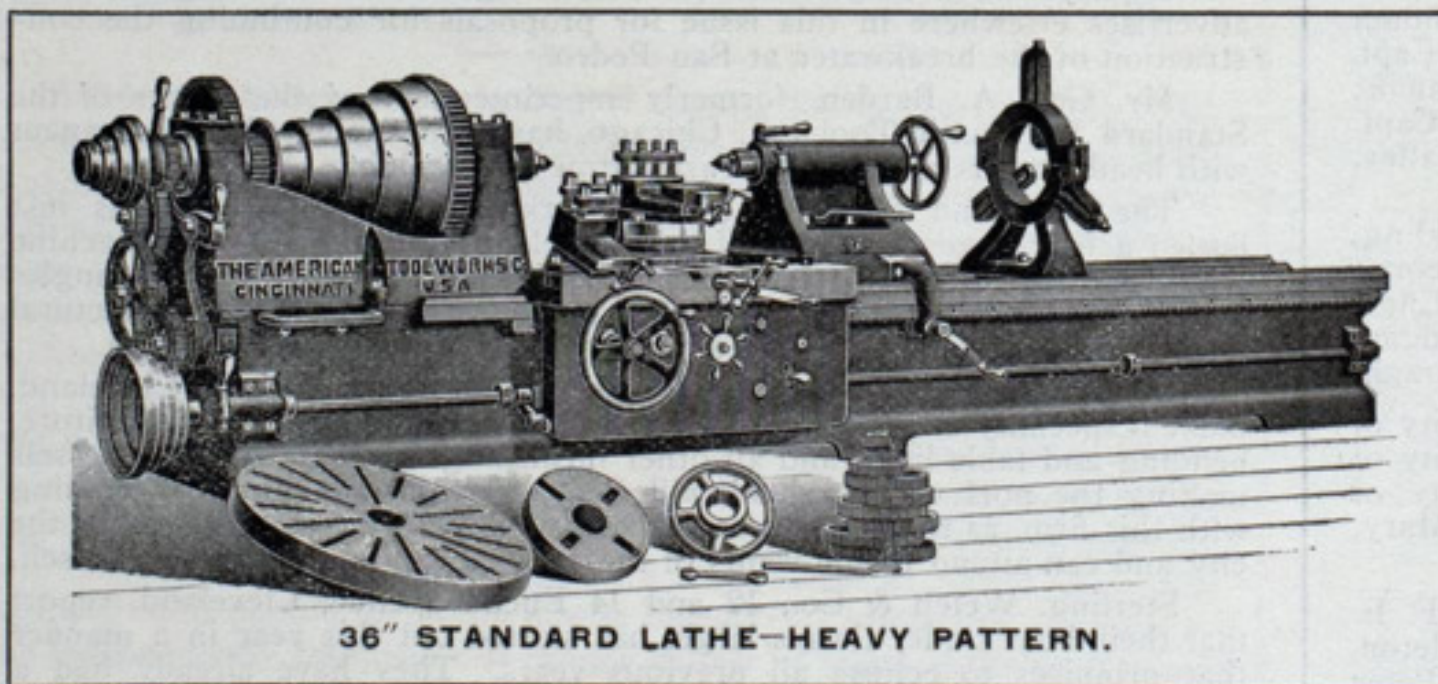
THE RISDON IRON & LOCOMOTIVE WORKS.

San Francisco, Cal., April 6, 1900.

U. S. Engineer Office, Jones Building, Detroit, Mich., April 6, 1900. Sealed proposals for removing boulders, excavating limestone bedrock, and dredging in lower Detroit River, will be received here until 12 noon (standard time), April 30, 1900, and then publicly opened. Information furnished on application. G. J. Lydecker, Lt. Col., Engrs.
April 26.

Deep Water Harbor, San Pedro, Cal.—U. S. Engineer Office, Laughlin Building, Los Angeles, Cal., April 12, 1900. Sealed proposals for continuing construction of breakwater at San Pedro, Cal., will be received here until 11 A. M. May 14, 1900, and then publicly opened. Information furnished on application. James J. Meyler, Capt., Engrs.
May 3.

Tools for Economical Production.



36" STANDARD LATHE—HEAVY PATTERN.

We build complete lines of Machine Tools for machine shop equipments, viz:

Lathes, Planers,
Drills, Shapers,
Boring Mills, Etc.

Investigate our lines before buying.

The American Tool Works Co.,

BUILDERS OF COMPLETE LINES OF MACHINE TOOLS,

WORKS: CINCINNATI, U. S. A.

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BOSTON STORE: 36 Federal Street.

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SAN FRANCISCO: Henshaw, Bulkley & Co.

DENVER AND SALT LAKE CITY: The Mine & Smelter
Supply Co.

LONDON: Alfred Herbert, Ltd., 7 Leonard St.,
Finsbury, E. C.

DÜSSELDORF: de Fries & Co., Act. Ges.,
Graf Adolf Strasse, 83-87

ANTWERP: Nyssens Freres, 33 Rue des Peignes.

BERLIN: de Fries & Co., Act. Ges.,
Kloster Strasse, 13-15.

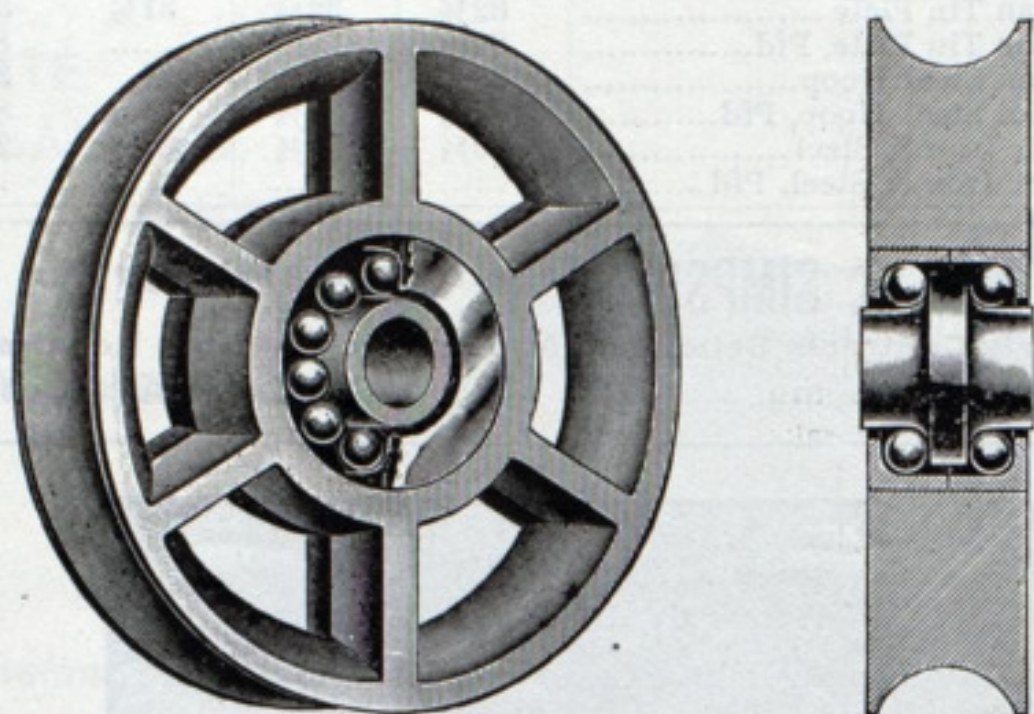
PARIS: Roux Frères & Cie., 54 Boulevard
du Temple.

MOSCOW: Alfred Stucken.

DONOHUE'S PATENT BALL BEARING SHEAVE.

John T. Donohue & Co., Baltimore, Md., manufacturers of tackle blocks, ship hardware, etc., are putting on the market a new style of patent sheave, illustrated herewith. It represents the application of the famous ball bearing principle to sheaves and bushings. All the world knows how successfully it works in connection with bicycles, and it is believed by practical men that there is a similar field for success in applying it to sheaves and bushings.

The position of the balls is shown in the illustration. The balls are made of cold-rolled steel, and are intended to withstand the heaviest pressure. Severe practical tests of long duration have already been made



BALL BEARING SHEAVE.

SECTION—ARRANGEMENT OF TWO ROWS OF BALLS.

of the sheave in the steering gears of several tugs and Chesapeake bay steamers, and the results have proved satisfactory in all respects. All block makers and users of sheaves will appreciate the fact that here friction is reduced to a minimum. These sheaves are said to run easier than anything of the kind ever used. The strain is evenly supported by two sets of balls, which run on hard gun metal casings, and the effect is less work and greater results. The moderate price of the sheaves in connection with their durability and delightful ease in carrying a load will, it is expected, make them a strong favorite with the trade. The manufacturers will be pleased to furnish catalogue with full information to interested parties, and solicit trial orders.

The Watson Radial W. T. Boiler.

REPORT OF PERFORMANCE OF TEN H. P. COMPOUND.

COPY OF LETTER FROM CAPT. NEWHALL.

Washington.
"I suppose you think it is nearly time I reported on the performance of the little boiler you sent me last March. At first I had trouble keeping steam, but soon found that it was the fault of the fireman. The boiler works very satisfactorily indeed, and is giving great results. Steamboat men about here are much interested in its performance. I shall want a much larger boiler soon, and will give details later."

This little boiler is only 3 ft. 9 in. high, by 30 in. base, has only 42 sq. ft. h.-s., and 1.65 sq. ft. g.-s., but it drives a 3x5x5-inch condensing compound, 250 r.-p.-m., with air and feed pump on natural draft. Weight of boiler, 600 pounds. Working pressure, 200 pounds.

I build boilers up to 150 h. p.

EGBERT P. WATSON, Mfr.,

MADISON AVE. SHOPS,

ELIZABETH, N. J.

FERRO NICKEL MANGANESE FOR CUPOLA, CRUCIBLE or ladle use is the only low-priced but high grade alloy that converts hard white iron into soft ductile steel castings; a sample keg, 100 pounds, shipped for trial to any responsible foundryman. Made from the Durango Iron Mountain high-grade nickel and manganese under Mexican patent by The National Ore & Reduction Co., Durango, Mexico. Stahlknecht y Cia., Bankers, sole agents for the Mexican Republic, Durango, Mexico. Howard Chemical Works, St. Louis, Mo., agents. May 3.

BUSINESS CHANCE FOR A BUSINESS MAN to establish a branch agency in New York for a new meritorious product manufactured under a patented process in France and Mexico, and endorsed and adopted by four foreign governments and twenty-eight railway companies abroad. United States Arsenal tests and reports now ready for publication, with many authoritative testimonials. The product has an enormous demand with positively no competition in the United States, and will be shipped on trial to any interested responsible party. Applicants are expected to furnish the very best of references, and to such exceptional inducements with credit, will be granted in the United States. An independent income for a competent business man. Wire us your intentions, and secure your territory at once. The National Ore & Reduction Co., Durango, Mexico. May 3.

BELLEVILLE GENERATORS.

GRAND PRIZE AT THE WORLD'S FAIR OF 1889.

List of Ocean Steamships on Board which BELLEVILLE GENERATORS are Used.

FRENCH NAVY.

Despatch Boat VOLTIGEUR; Squadron's Look-out Ship MILAN; Squadron's Look-out Ship HIRONDELLE; Gunboat CROCODILE; Despatch Boat ACTIF; Cruiser AMIRAL RIGAUD DE GENOUILLY; Iron Clad Cruiser ALGER; Iron Clad Cruiser LATOUCHE-TREVILLE; Iron Clad Cruiser CHANZY; Iron Clad Cruiser AMIRAL CHARNER; Tug ABERVRAC'H; Despatch Boat CAUDAN; Torpedo Despatch Boat LEGER; Torpedo Despatch Boat LEVRIER; Battleship BRENNUS; Protected Coast Guard AMIRAL TREHOUART; Iron Clad Cruiser BRUIX; Iron Clad Cruiser BUGAUD; Cruiser DESCARTES; Battleship BOUVET; Cruiser POTHUAU; Cruiser GALILEE; Cruiser PASCAL; Cruiser CATINAT; Battleship CHARLEMAGNE; Cruiser LAVOISIER; Cruiser PROTET; Battleships GAULOIS, SAINT LOUIS and HOCHÉ; Iron Clad IENA; Cruiser DESAIX; Iron Clad Cruiser DUPETIT-THOUARS; Cruiser DUPEIX; Cruiser FURIEUX; Battleship NEPTUNE; Battleship DEVASTATION; Cruisers SULLY, AMIRAL AUBE and MARSEILLAISE.

MESSAGERIES MARITIMES: Cargo Steamer ORTEGAL; Mail Steamships SINDH, AUSTRALIEN, POLYNESIEN, ARMAND-BEHIC, VILLE-DE-LACIOTAT, ERNEST-SIMONS, CHILI, CORDILLERE, LAOS, INDUS, TONKIN, ANNAM, ATLANTIQUE.

COMPAGNIE DES CHEMINS DE FER DE L'OUEST, (Plying between Dieppe and Newhaven): Freight Steamers ANGERS, CAEN, BREST, CHERBOURG; Fast Steamers TAMISE, MANCHE, FRANCE.

RUSSIAN NAVY.

Iron Clad Frigate MININE; Gunboat GROZIASCHY; Imperial Yacht MAREVO; Imperial Yacht STRELA; Gunboat GREMIASCHY; Gunboat OTVAJINI; Imperial Yacht TZAREWNA; Imperial Yacht STANDARD; Cruiser ROSSYA; School Ship VERNY; Cruiser SVETLANA; Cruiser DIANA; Cruiser PULLADA; Torpedo Transport Boat BAKAN; KHERSON and MOSKBA, Ships of the Volunteer Fleet; Gunboat GILACH; Iron Clad EKATERINA II; Gunboat KOUBANETZ; Cruiser AURORA; Iron Clad EMPEREUR NICOLAS I; Iron Clad PRINCE POTIEMKINE DE TAURIDE; Cruiser BAYAN; Iron Clad CESAREWITCH; Gunboats TERETZ and OURALETZ; Iron Clad BORODINOW; SMOLENSK, Ship of the Russian volunteer fleet; cruiser BOJARINE.

ENGLISH NAVY.

Torpedo Boat Destroyer SHARPSHOOTER; POWERFUL and TERRIBLE, iron clad cruisers; GLADIATOR, ARROGANT, FURIOUS, VINDICTIVE, cruisers; NIOBE, DIADEM, ANDROMEDA, EUROPA, cruisers; CANOPUS, GLORY, GOLIATH, ALBION, OCEAN, iron clad ships; ARGONAUT, ARIADNE, AMPHITRITE, SPARTIATE, HERMES, HIGHFLYER and HYACINTH, cruisers; VENGEANCE, iron clad; ALBERT AND VICTORIA, royal yacht; CONDOR

and ROSARIO, sloops; CRESSY, ABOUKIR, SUTLEY and HOGUE, cruisers; IMPLACABLE, FORMIDABLE and IRRESISTIBLE, VENERABLE, LONDON, BULWARK, iron clad ships; EURYALUS, BACHANTE, cruisers; MUTINE, RINALDO, SHEARWATER, sloops; CORNWALLIS, DUNCAN, EXMOUTH, RUSSEL, iron clad ships; DRAKE, KING ALFRED, LEVIATHAN, AFRICA, cruisers; VESTAL, sloop; MONMOUTH, cruiser; BEDFORD, cruiser; ESSEX, KENT, cruisers; ALBEMARLE, MONTAGUE, battleships.

The total horse power of boilers fitted on board the 57 above named ships of the British navy is nearly 900,000.

AUSTRIAN NAVY.

BUDA-PEST, iron clad coast guard; KAISER KARL VI, cruiser; X', X'', battleships.

ITALIAN NAVY.

VARESE, cruiser; BENEDETTO BRIN, battleship.

ARGENTINE REPUBLIC.

PUEYRREDON, cruiser; Steamships PUERTO-HUERGO and MENDOZA.

SPANISH NAVY.

REINA REGENTE, cruiser.

CHILIAN NAVY.

O'HIGGINS, cruiser; ALMIRATE LYNCH, torpedo boat destroyer; ALMIRANTE CONDELL, torpedo boat destroyer; GENERAL BAQUEDANO, school ship.

JAPANESE NAVY.

SHIKISHIMA, iron clad; CHIYODA, cruiser; ASAHI, iron clad; IWATE, cruiser; AZUMA, cruiser; HATSUSE, iron clad; ITSUKUSHIMA, iron clad coast guard; MIKASA, battleship.

UNITED STATES OF AMERICA.

Northern Steamship Co.'s Passenger Steamers NORTH WEST and NORTH LAND, of 7,000 H. P. each; yachts SHEARWATER, CORYELL, WILD DUCK, SULTANA.

Cable Address: BELLEVILLE SAINT-DENIS-SUR-SEINE.

General Information Sent on Demand.

NEW BOOKLETS.

The Chicago, Milwaukee & St. Paul Railway is issuing a series of booklets regarding points of interest along its lines, and if you are interested in the western country, or contemplate a trip, write George H. Heafford, general passenger agent, Chicago, for the special publication desired, enclosing four cents in stamps for postage for each one.

- No. 1. The Pioneer Limited.
- No. 2. The Land of Bread and Butter.
- No. 3. The Fox Lake Country.
- No. 4. Fishing in the Great North Woods.
- No. 5. The Lake Superior Country.
- No. 6. Cape Nome Gold Diggings.
- No. 8. Summer Days in the Lake Country.
- No. 9. Summer Homes, 1900.
- No. 11. The Game of Skat.
- No. 12. Milwaukee—The Convention City.
- No. 13. A Farm in the Timber Country.
- No. 14. Stock Raising in the Sunshine State.
- No. 15. Hunting and Fishing.

April 12.

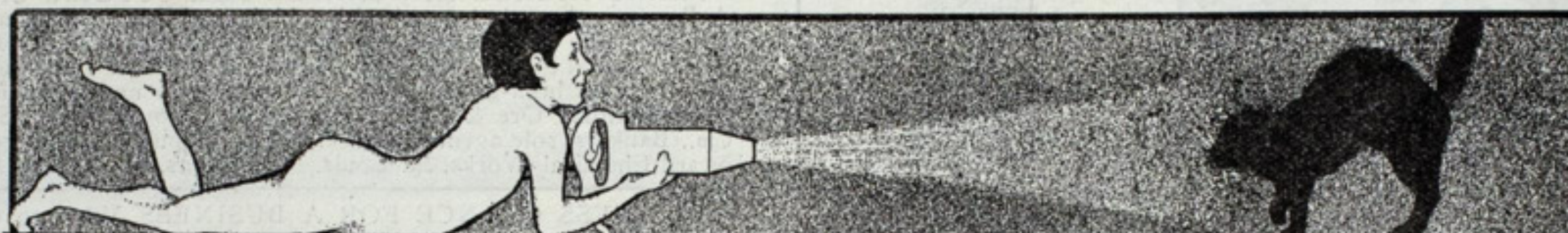
The international convention of boilermakers and iron ship build will be held in Kansas City July 2. There are 122 lodges in the United States and Canada and each lodge is entitled to from one to six delegates.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland,
date of April 11, 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	52	52½	50¼	51
American Steel & Wire, Pfd.....	89	89	87	87
Federal Steel.....	47½	49	46½	48½
Federal Steel, Pfd.....	72½	73¼	72½	73¼
National Steel.....	41	42	41	41½
National Steel, Pfd.....	94	94
American Tin Plate.....	32½	32½	31½	31½
American Tin Plate, Pfd.....	84	84
American Steel Hoop.....	33	33	32	33
American Steel Hoop, Pfd.....	80½	80½	80	80
Republic Iron & Steel.....	20½	20½	20½	20½
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19 YEARS EXPERIENCE.
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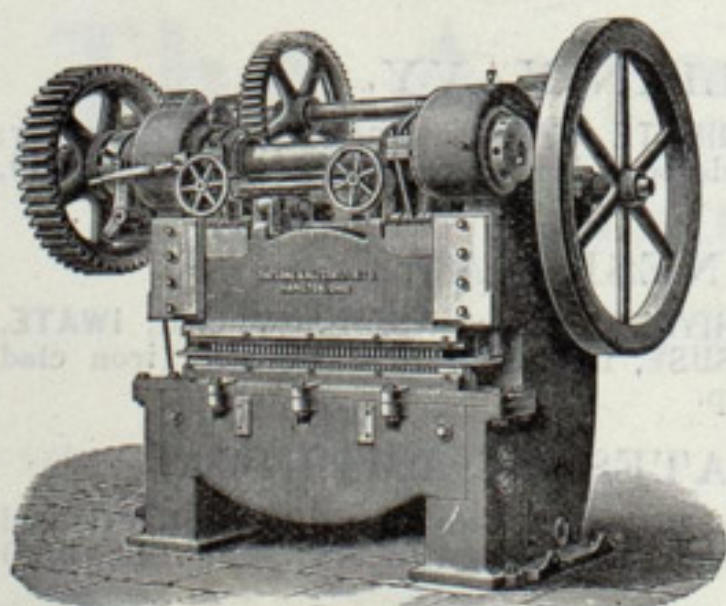
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THE LARGEST MANUFACTURERS OF FIBER IN THE WORLD.

A SPECIALTY:

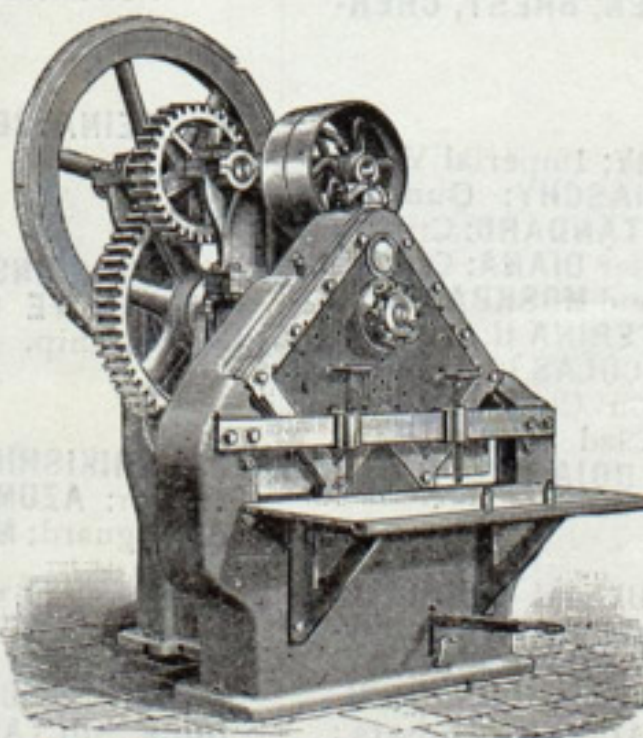
4-STRAND PLUMBAGO HEART HOISTING ROPE FOR CARGO FALLS

LABOR SAVING.....



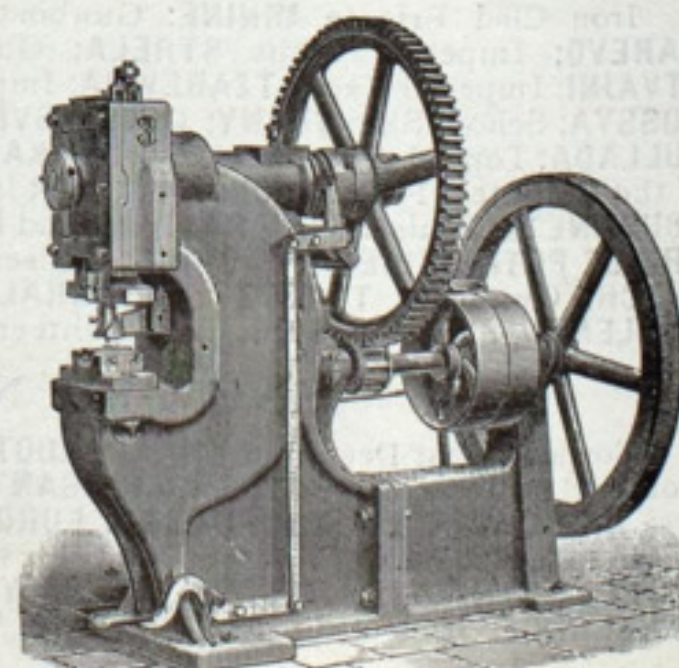
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Manufactured by

POWER SHEARS



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THE CLEVELAND PUNCH & SHEAR WORKS CO., CLEVELAND, O., U. S. A.

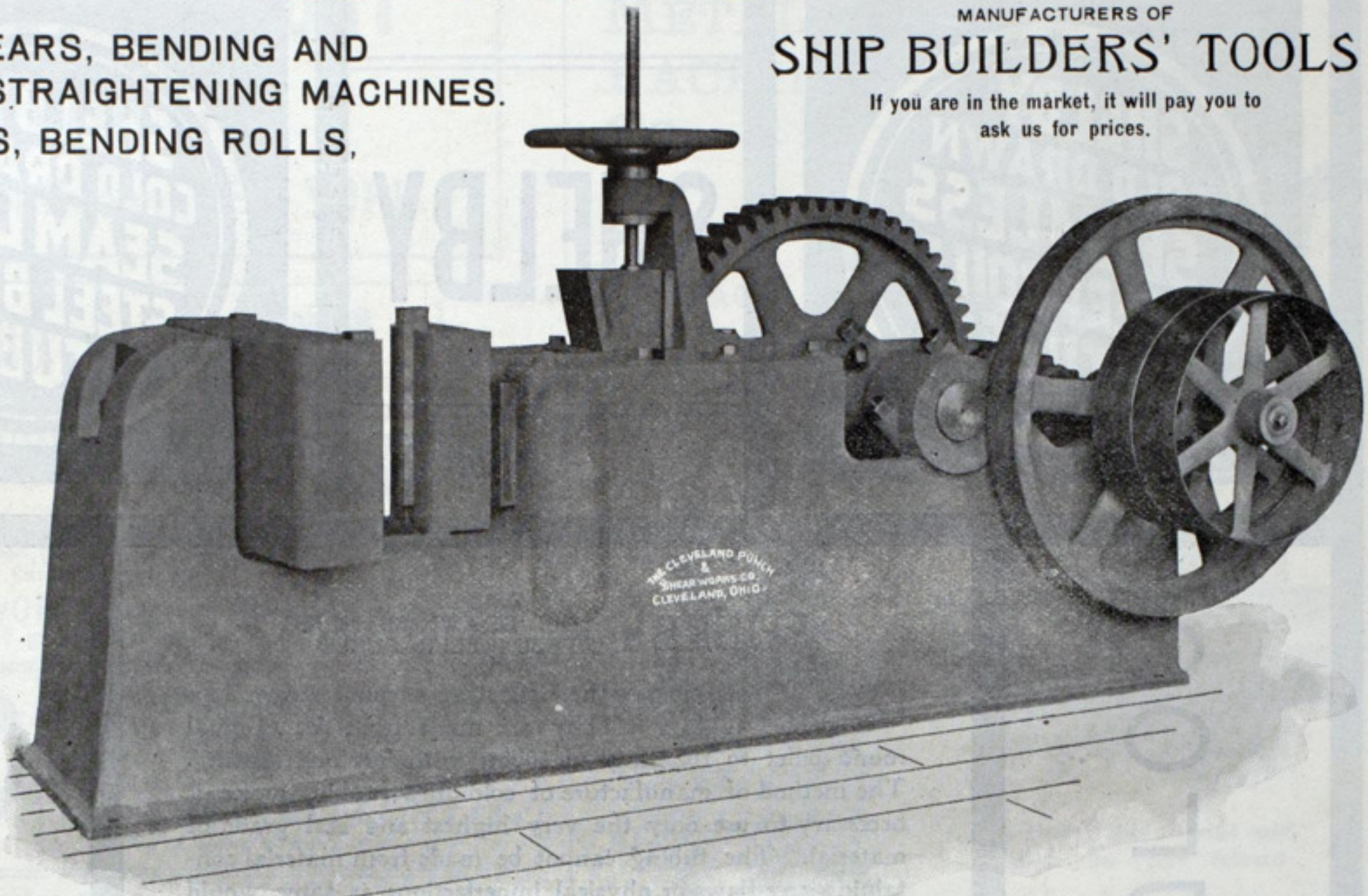
PUNCHES, SHEARS, BENDING AND
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PLANERS,
ETC.

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STANDARD
for
Strength, Reliability
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Beauty of Design.



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If you are in the market, it will pay you to
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BENDING AND STRAIGHTENING MACHINE.

This machine is designed for bending and straightening Angles, Channels, Rails, Beams, etc., and is especially useful in structural iron work. The Dies are arranged to be placed one upon the Plunger, the other on the Bed, and can be reversed so that material can be bent to a complete circle. The Plunger has a Wedge for changing the position of the Plunger Die. This Wedge is operated by a Hand-Wheel and Screw and can be adjusted very quickly. This machine has a capacity to bend or straighten from the smallest angle to a 15-inch beam. Code name, Owl.

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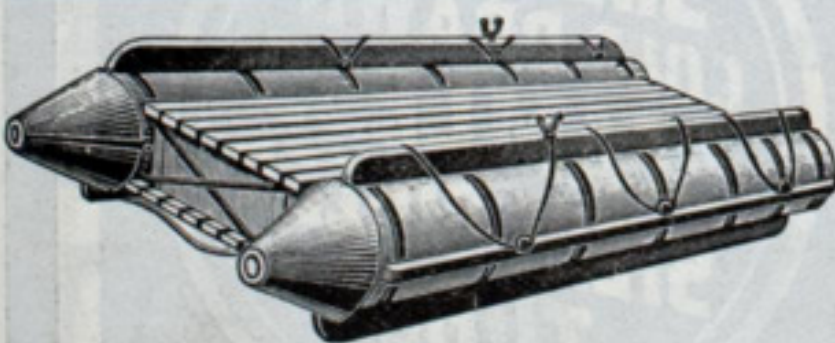
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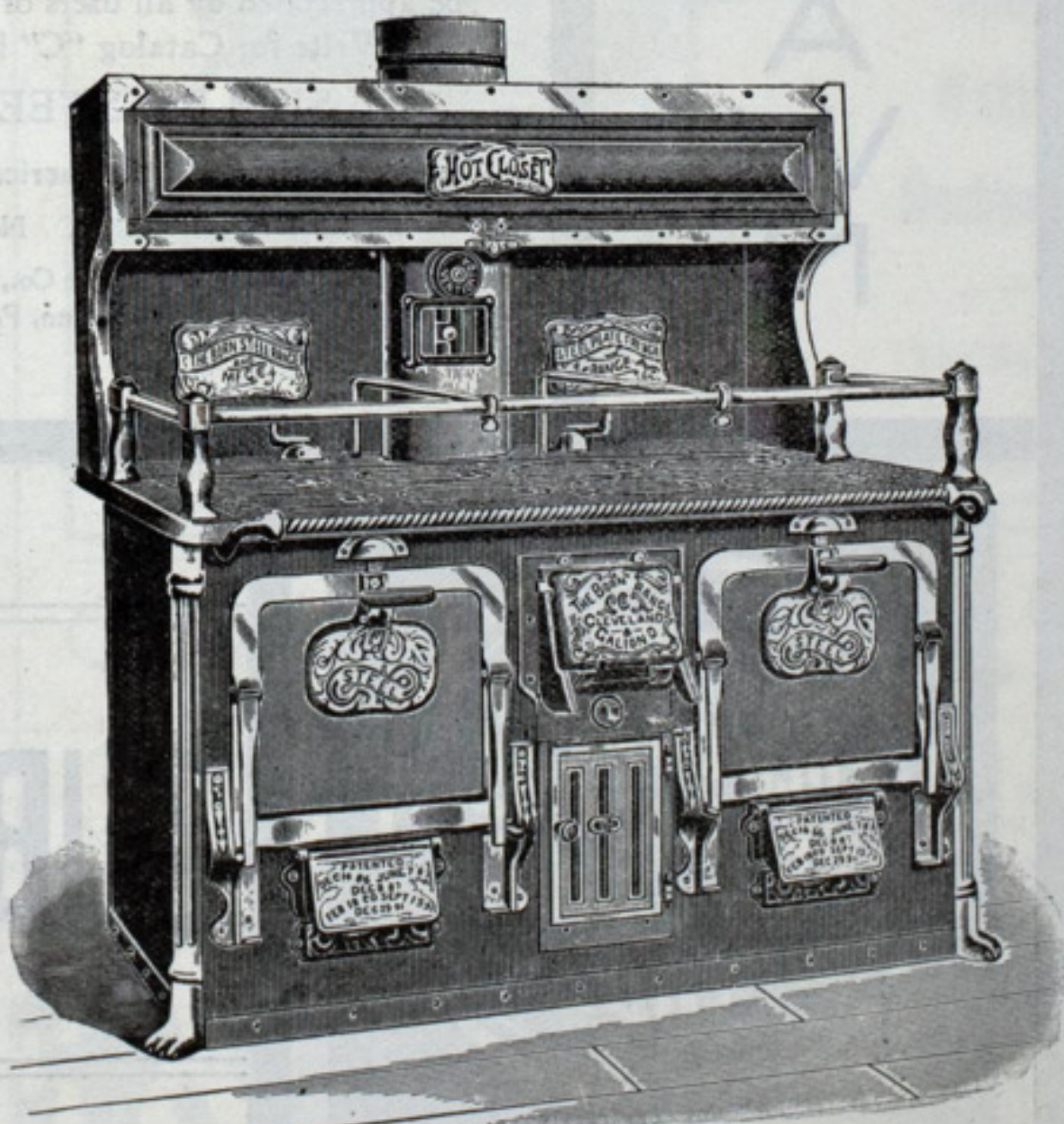
70 and 72 Kent St., BROOKLYN, NEW YORK.



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OVERCOME most of the difficulties encountered in lap-welded tubing. They are made from the original round billet to the finished tubing with but one heating. The method of manufacture of cold drawn tubing makes it necessary to use only the very highest and best grade of material. The tubing cannot be made from material containing any flaws or physical imperfections as same would become apparent in either the piercing or cold drawing operation. Shelby Boiler Tubes are very dense, tough and exceedingly ductile and will withstand more manipulation and abuse before failure than any other tubing. Shelby Boiler Tubes are truer to size and gauge and more nearly concentric than is possible to manufacture lapwelded tubing. They are very smooth inside, lessening the liability to collect scale and making them more easy to clean. Shelby Boiler Tubes do not crack or fail at the ends, thus overcoming the difficulty of leakages around tubes ends, a merit which will be appreciated by all users of boilers.

Write for Catalog "C" for further information.

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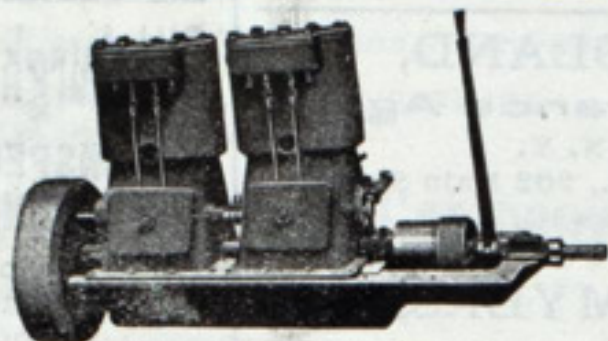
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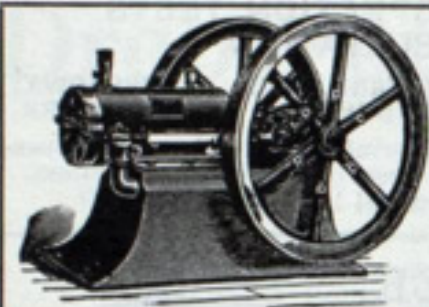
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Send stamp for 1900 Catalogue just out.

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Backus One-Way Engine with Friction Gearing.

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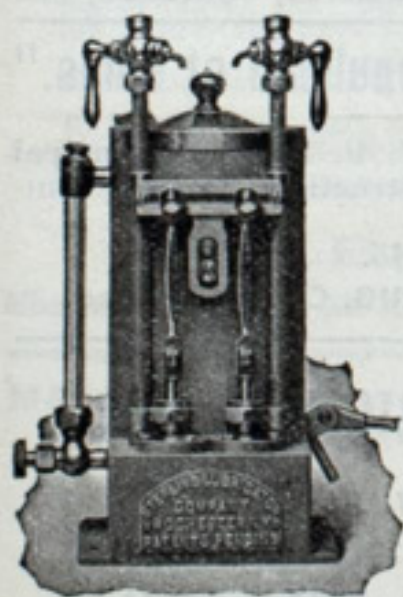
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WELDLESS COLD DRAWN STEEL

BOILER TUBES.

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Are the Only Automatic Force Feed Pump Lubricators having Hand Attachment. May be adjusted while in full motion without danger.

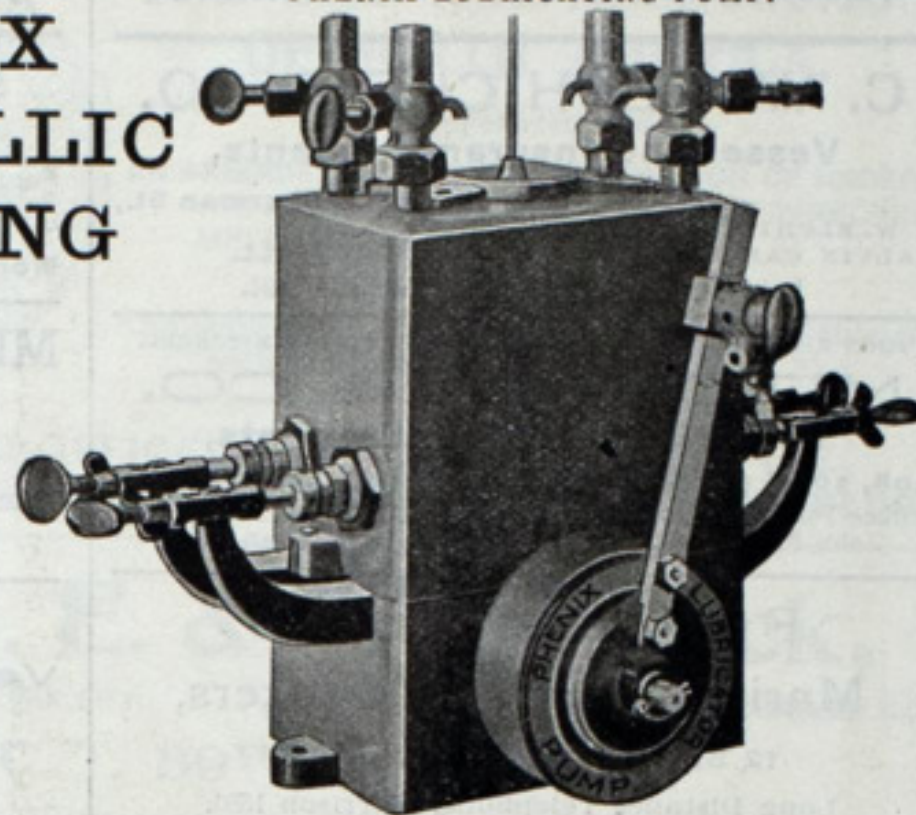
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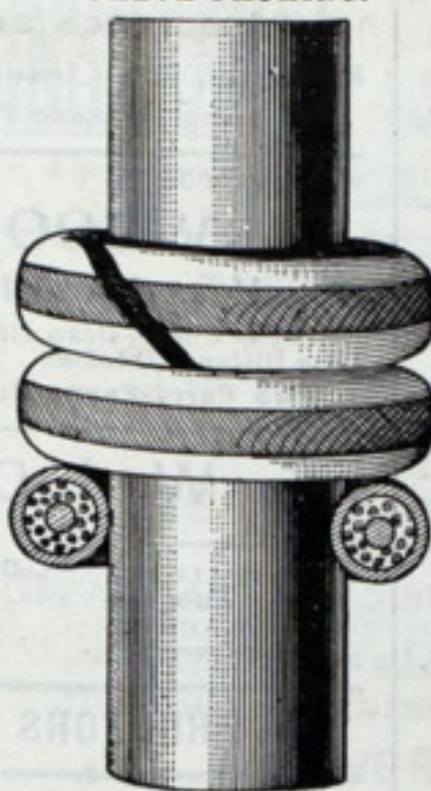
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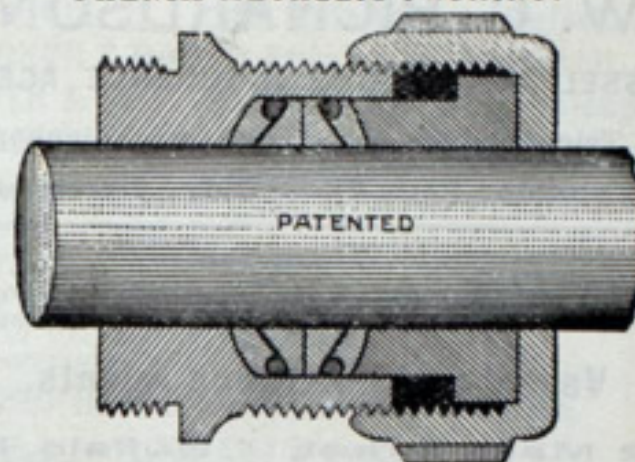
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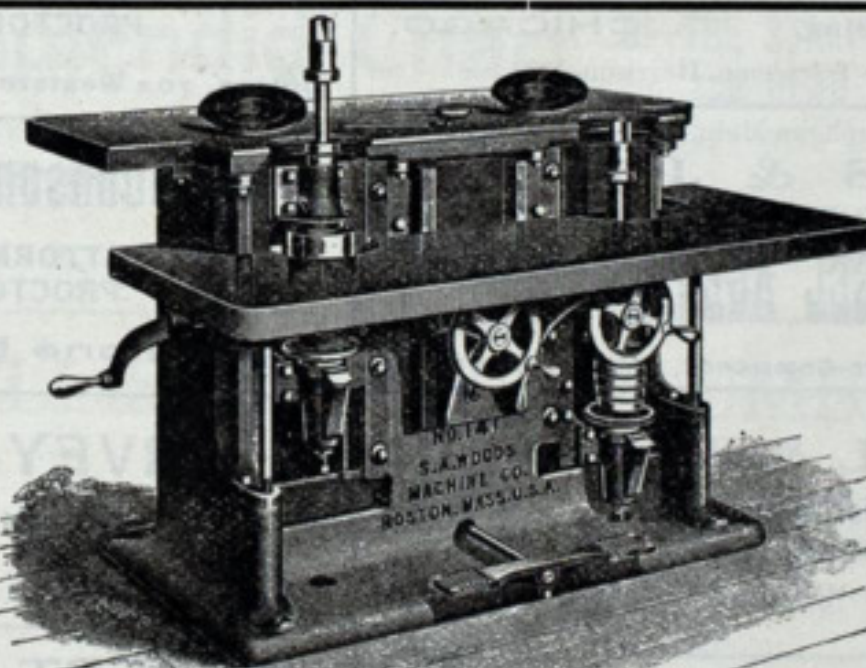
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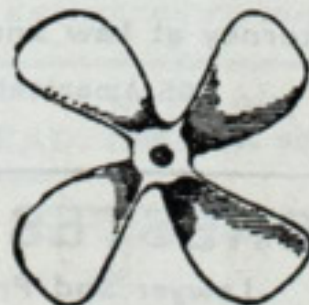
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SPECIALTY SMALL YACHT WHEELS.

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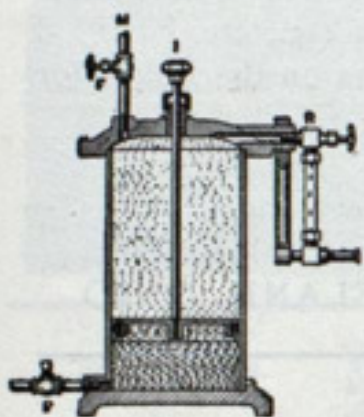
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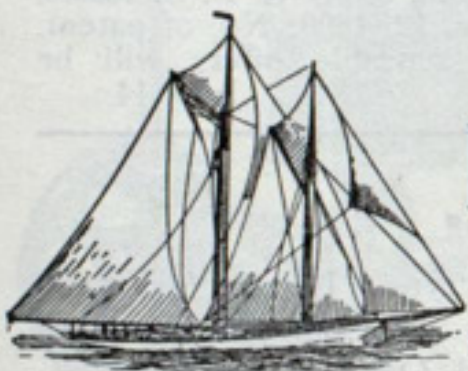
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April 12

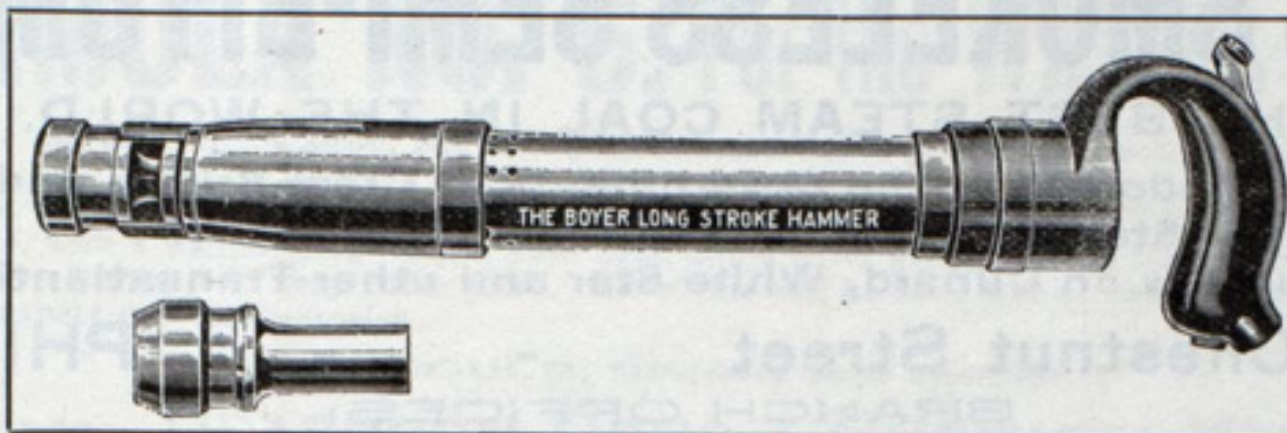
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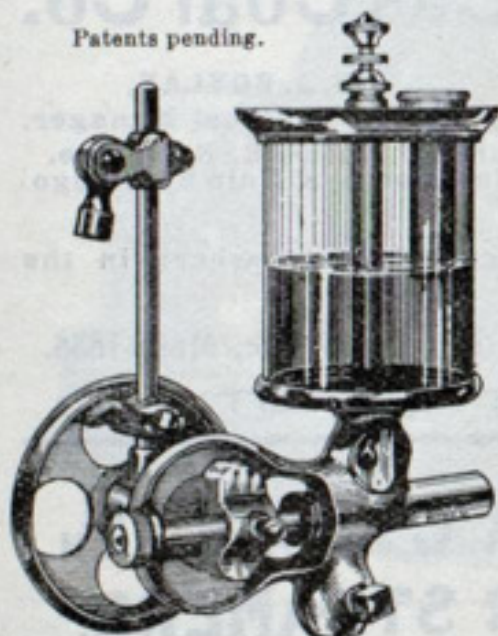
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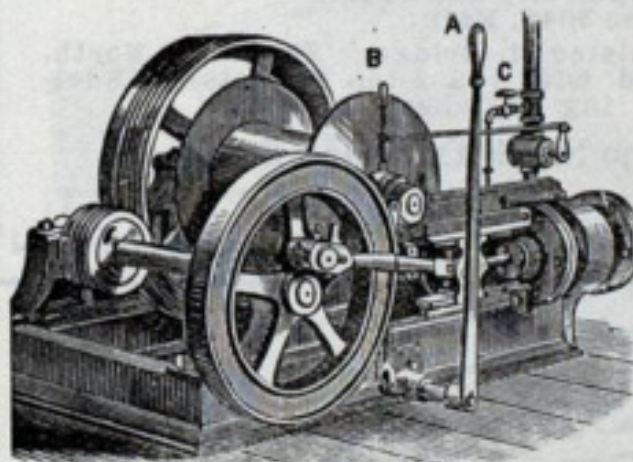
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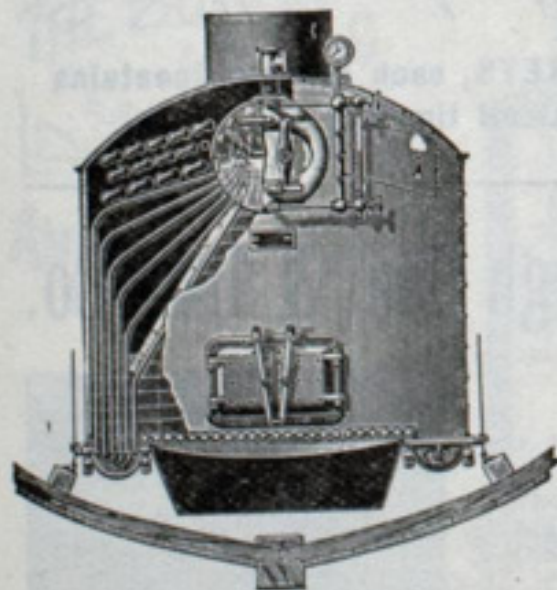
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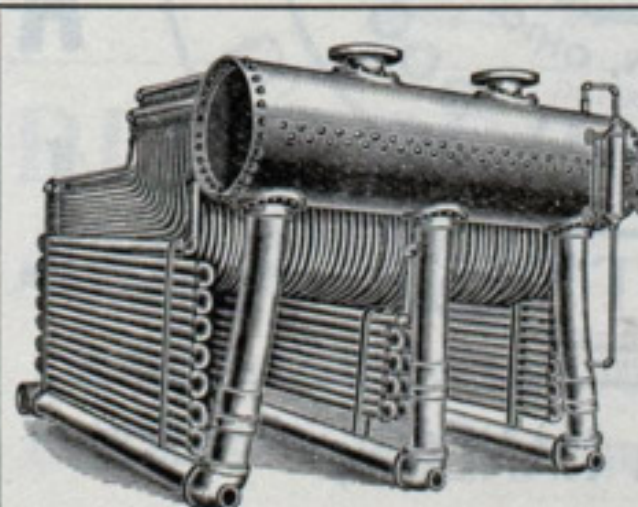
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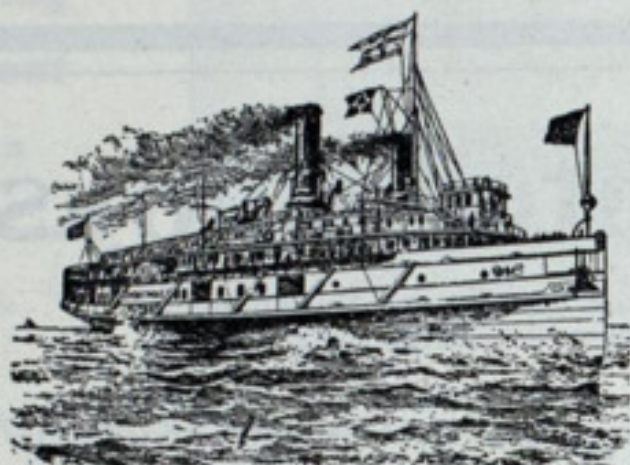
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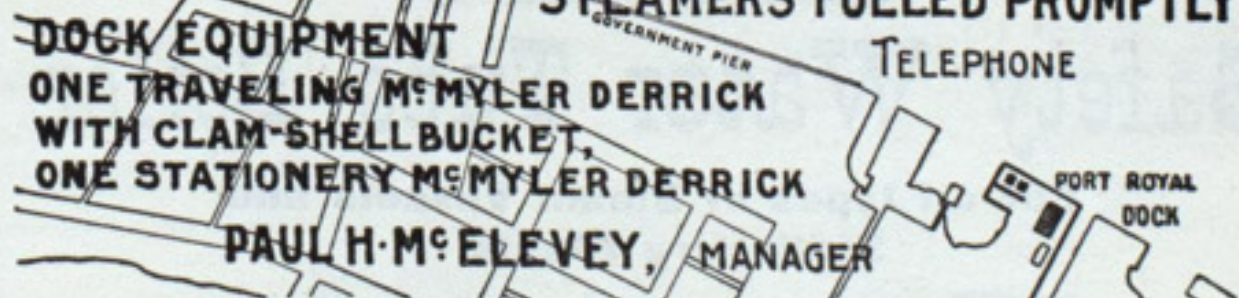
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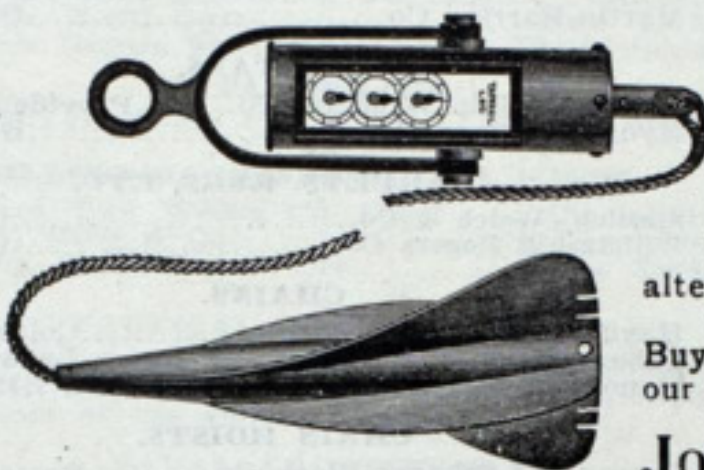
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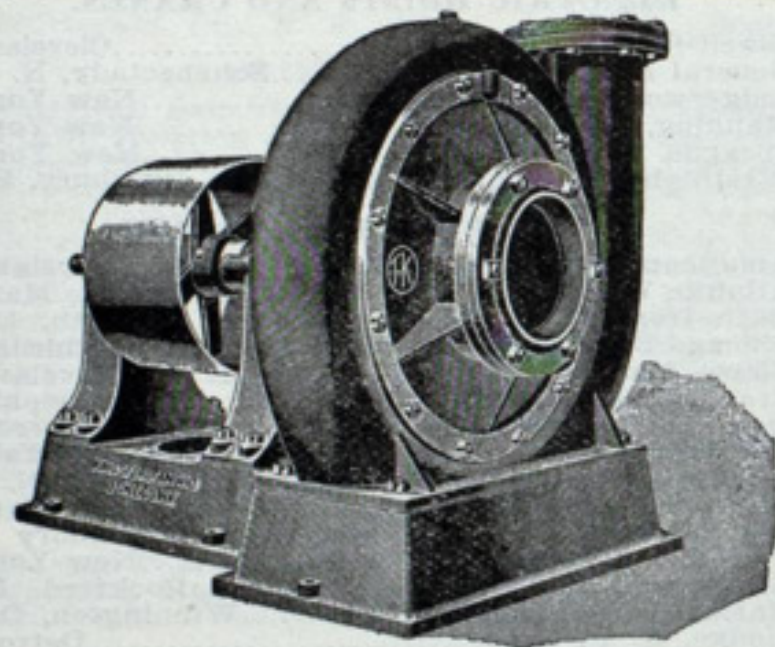


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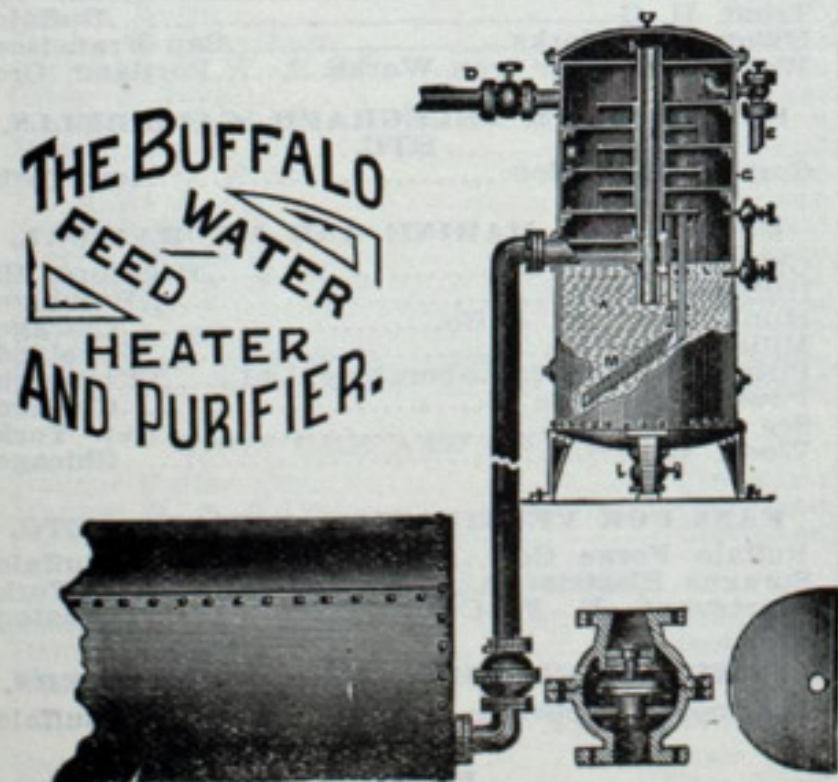
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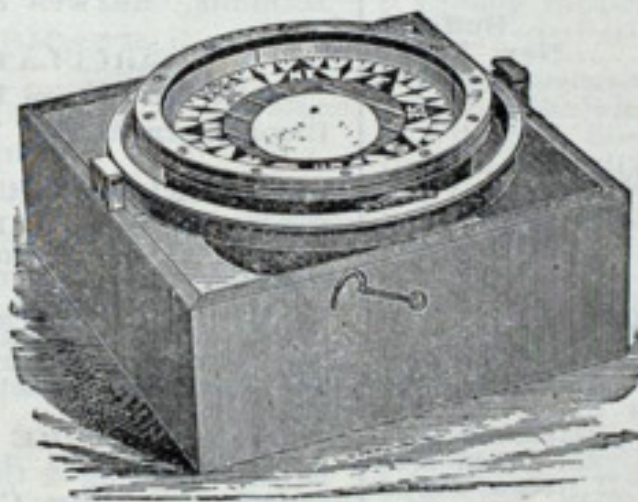


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Pinney, Orestes C.....Cleveland.
White, Johnson, McCaslin & Cannon.....Cleveland.

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Bethlehem Steel Co.....So. Bethlehem, Pa.

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Illinois Smelting & Refining Works.....Chicago.
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Cleveland Block Co.....Cleveland.
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Electric Boat Co.....New York.
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& Co., Consolidated.....New York.
Lane & DeGroot.....Brooklyn.

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Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer Water Tube Boiler Co.....New York.
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Cramp, Wm. & Sons.....Philadelphia.
Deering Water Tube Boiler Co.....Detroit.
Delaunay, Belleville & Co.....St. Denis, France.
Detroit Screw Works.....Detroit.
Detroit Shipbuilding Co.....Detroit.
Farrar & Trefts.....Buffalo.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Engine Co.....Weymouth, Mass.
Gas Engine & Power Co.....Morris Heights, N. Y.
Harlan & Hollingsworth Co.....Wilmington, Del.
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Jenks Ship Building Co.....Port Huron, Mich.
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MacKinnon Mfg. Co.....Bay City, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
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Morse Iron Works & Dry Dock Co.....Brooklyn.
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Newport News Ship Bldg. Co.....Newport News, Va.
Nixon, Lewis.....Elizabeth, N. J.
Pusey & Jones Co.....Wilmington, Del.
Roberts Safety Water Tube Boiler Co.....New York.
Stirling, The Co.....Chicago.
Trigg, Wm. R. Co.....Richmond, Va.
Union Iron Works.....San Francisco.
Watson, Egbert P.....Elizabeth, N. J.
Wolff & Zwicker Iron Works.....Portland, Ore.

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Dearborn Drug & Chemical Works.....Chicago.

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Hall Compound Feeder Co.....Chicago.

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Hungerford Brass & Copper Co.....New York.
Shelby Steel Tube Co.....Cleveland.

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Scherzer Rolling Lift Bridge Co.....Chicago.

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Webster, Camp & Lane Machine Co.....Akron, O.

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Manning, Maxwell & Moore.....New York.
McMyler Mfg. Co.....Cleveland.
Sprague Electric Co.....New York.
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Detroit Shipbuilding Co.....Detroit.
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Manning, Maxwell & Moore.....New York.
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Detroit Shipbuilding Co.....Detroit.
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 Hyde Windlass Co.....Bath, Me.
 Lidgerwood Mfg. Co.....New York.
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 Pickands, Mather & Co.....Cleveland.

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 Sterling Lubricator Co.....Rochester, N. Y.

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Katzenstein, L. & Co.....New York.
 Phenix Metallic Packing Co.....Chicago.
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Ajax Metal Co.....Philadelphia.
 Cramp, Wm. & Sons.....Philadelphia.
 Illinois Smelting & Refining Works.....Chicago.
 Magnolia Metal Co.....New York.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.

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Bertram's Oil Polish Co.....Boston, Mass.

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 Manning, Maxwell & Moore.....New York.

NAUTICAL INSTRUMENTS.

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 Hillman, Gustav.....Brooklyn.
 Kirby, Frank E.....Detroit.
 See, Horace.....New York.
 Wood, W. J.....Chicago.

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 Katzenstein, L. & Co.....New York.
 Phenix Metallic Packing Co.....Chicago.
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Chicago Pneumatic Tool Co.....Chicago.

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 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

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Ellis Marine Plumbing Co.....New York.
 Mott Iron Works, J. L.....New York.
 Sands, Alfred B. & Son.....New York.
 Kenney, The Co.....New York.

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Chicago Pneumatic Tool Co.....Chicago.
 Manning, Maxwell & Moore.....New York.
 Philadelphia Pneumatic Tool Co.....Philadelphia.
 Q. & C. Co.....Chicago.

POCAHONTAS COAL.

Castner, Curran & Bullitt.....Philadelphia.

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Bertram's Oil Polish Co.....Boston, Mass.

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American Ship Building Co.....Cleveland.
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 Detroit Shipbuilding Co.....Detroit.
 Farrar & Trefts.....Buffalo.
 Fore River Engine Co.....Weymouth, Mass.
 Hyde Windlass Co.....Bath, Me.
 Harlan & Hollingsworth Co.....Wilmington, Del.
 Hodge, S. F. & Co.....Detroit.
 Jenks Ship Building Co.....Port Huron, Mich.
 MacKinnon Mfg Co.....Bay City, Mich.
 Maryland Steel Co.....Sparrow's Point, Md.

Moran Bros. Co.....Seattle, Wash.
 Morse Iron Works & Dry Dock Co.....Brooklyn.
 Neafie & Levy Ship & Eng. Bldg Co.....Philadelphia.
 Newport News Ship Bldg. Co.....Newport News, Va.
 Nixon, Lewis.....Elizabeth, N. J.
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
 Pusey & Jones Co.....Wilmington, Del.
 Sheriffs Mfg. Co.....Milwaukee.
 Trigg, Wm. R. Co.....Richmond, Va.
 Trout, H. G.....Buffalo.
 Union Iron Works.....San Francisco.
 Wolff & Zwicker Iron Works.....Portland, Ore.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
 General Electric Co.....Schenectady, N. Y.
 Rushmore Dynamo Works.....Jersey City, N. J.
 Sprague Electric Co.....New York.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co.....New York.
 Davidson, M. T.....Brooklyn, N. Y.
 Donohue & Co., John T.....Baltimore.
 Kingsford Foundry & Machine Works.....
 Oswego, N. Y.
 Van Duzen, The E. W. Co.....Cincinnati.
 Worthington, Henry R.....New York.

PUNCHES, RIVETERS, SHEARS.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Cleveland Punch & Shear Works Co.....Cleveland.
 Long & Allstatter Co.....Cincinnati.
 Manning, Maxwell & Moore.....New York.
 New Doty Mfg. Co.....Janesville, Wis.
 Philadelphia Pneumatic Tool Co.....Philadelphia.
 Wood & Co., R. D.....Philadelphia.

RANGES, KITCHEN OUTFITS.

Born Steel Range Mfg. Co.....Cleveland.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Chicago.

Standard Aut. Releasing Hook Co.....New York.
 RELEASEING HOOKS FOR DETACHING BOATS.

RIVETS, STEEL, FOR SHIPS AND BOILERS.
 Bourne-Fuller Co.....Cleveland.

ROPE.

American Mfg. Co.....New York.
 See also ship chandlers.

RUBBER INSULATED WIRES.

Roebbling's Sons, John A.....New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co.....Boston.
 Ashton Valve Co.....Boston.
 Consolidated Safety Valve Co.....New York.
 Crosby Steam Gage & Valve Co.....Boston.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
 Upson-Walton Co.....Cleveland.
 Wilson & Silsby.....Boston.

SALVAGE COMPANIES.

See wrecking companies.

SCREW MACHINES.

American Tool Works Co. (The).....Cincinnati.
 Bement, Miles & Co.....Philadelphia.
 Manning, Maxwell & Moore.....New York.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
 General Electric Co.....Schenectady, N. Y.
 Rushmore Dynamo Works.....Jersey City, N. J.
 Sprague Electric Co.....New York.
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

SEPARATORS, (CENTRIFUGAL).

Keystone Engine & Machine Works.....Philadelphia.

SHAPERS.

American Tool Works Co. (The).....Cincinnati.
 Manning, Maxwell & Moore.....New York.

SHEARS.

See punches, riveters and shears.

SHEAVES, BALL BEARING.

Donohue & Co., John T.....Baltimore.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
 Atlantic Works.....East Boston, Mass.
 Bath Iron Works, Ltd.....Bath, Me.
 Cramp, Wm. & Sons.....Philadelphia.
 Craig Ship Building Co.....Toledo, O.
 Chicago Ship Building Co.....Chicago.
 Detroit Shipbuilding Co.....Detroit.
 Fore River Engine Co.....Weymouth, Mass.
 Harlan & Hollingsworth Co.....Wilmington, Del.
 Iowa Iron Works.....Dubuque, Ia.
 Jenks Ship Building Co.....Port Huron, Mich.
 McWilliams, Frank.....1 Broadway, New York.
 Maryland Steel Co.....Sparrow's Point, Md.
 Moran Bros. Co.....Seattle, Wash.
 Morse Iron Works & Dry Dock Co.....Brooklyn.
 Neafie & Levy Ship & Eng. Bldg. Co.....Philadelphia.
 Newport News Ship Bldg. Co.....Newport News, Va.
 Nixon, Lewis.....Elizabeth, N. J.
 Pusey & Jones Co.....Wilmington, Del.
 Roach's Ship Yard.....Chester, Pa.
 Townsend & Downey Ship Bldg. Co.....New York.
 Trigg, Wm. R. Co.....Richmond, Va.
 Union Dry Dock Co.....Buffalo.
 Union Iron Works.....San Francisco.
 Wolff & Zwicker Iron Works.....Portland, Ore.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

SHIP CHANDLERS.

Baker, Howard H. & Co. Buffalo.
 Moran, Bros. Co. Seattle, Wash.
 Upson-Walton Co. Cleveland.

SLING FRAME FOR HANDLING BARRELS.

Patriarche, H. R. Milwaukee.

SPARS—LARGE SIZES.

Moran Bros. Co. Seattle, Wash.

STAYBOLT IRON, HOLLOW AND SOLID.

Falls Hollow Staybolt Co. Cuyahoga Falls, O.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line. New York.
 International Nav. Co. Philadelphia.
 Red Star Line. New York.

STEAM VESSEL FOR SALE.

Holmes, Samuel. New York.

STEEL SHAFTS, SOLID OR HOLLOW.

Bethlehem Steel Co. So. Bethlehem, Pa.

STEERING APPARATUS.

American Ship Building Co. Cleveland.
 Chase Machine Co. Cleveland.
 Detroit Shipbuilding Co. Detroit.
 Donohue & Co., John T. Baltimore.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.
 Queen City Engineering Co. Buffalo.
 Sheriffs Mfg. Co. Milwaukee.
 Williamson Bros. Philadelphia.

STOKERS FOR MARINE SERVICE.

American Stoker Co. New York.

STOCKS, BONDS, SECURITIES.

Wright, Herbert & Co. Cleveland.

STOCKLESS ANCHORS.

Baldt Anchor Co. Chester, Pa.
 International Anchor Co. Cleveland.

STRUCTURES OF STEEL, BUILDERS OF.

Berlin Iron Bridge Co. East Berlin, Conn.

SURVEYORS, MARINE.

Curr, Robert. Cleveland.
 Gibbs & Joys. Milwaukee.

TELEGRAPH—DECK AND ENGINE ROOM.

Cory, Chas. & Son. New York.

TESTS OF MATERIAL.

Hunt, Robert W. & Co. Chicago.
 Pittsburgh Testing Laboratory, Ltd. Pittsburgh.

THRUST COLLARS FOR PROPELLER SHAFTS.

Ball Bearing Co. Boston, Mass.

TIMBER—LARGE PIECES.

Moran Bros. Co. Seattle, Wash.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

American Tool Works Co. (The). Cincinnati.
 Bement, Miles & Co. Philadelphia.
 Chicago Pneumatic Tool Co. Chicago.
 Cleveland Punch & Shear Works Co. Cleveland.
 Long & Allstatter, The Co. Hamilton, O.
 Manning, Maxwell & Moore. New York.
 New Doty Mfg. Co. Janesville, Wis.
 Philadelphia Pneumatic Tool Co. Philadelphia.
 Q. & C. Co. Chicago.
 Wood & Co., R. D. Philadelphia.

TRUCKS.

Boston & Lockport Block Co. Boston, Mass.

TOWING MACHINES.

American Ship Windlass Co. Providence, R. I.
 Chase Machine Co. Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
 Swain Wrecking Co. Detroit.

TUBING, STEEL, COPPER AND BRASS.

Atlantic Tube Co. Pittsburgh.
 Hungerford Brass & Copper Co., U. T. New York.
 Merchant & Co., Inc. Philadelphia.
 Shelby Steel Tube Co. Cleveland.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Crosby Steam Gauge & Valve Co. Boston.
 Jenkins Bros. New York.
 Manning, Maxwell & Moore. New York.

VARNISH MAKERS, COLOR GRINDERS, ETC.

Smith, Edward & Co. New York.

VARNISH PAINT.

Mair, John & Son. Philadelphia.

VESSEL AND FREIGHT AGENTS.

Boland, John J. Buffalo.
 Brown & Co. Buffalo.
 Drake & Maytham. Buffalo.
 Elphicke, C. W. & Co. Chicago.
 Gibbs & Joys. Milwaukee.

Hall & Root. Buffalo.
 Hawgood & Moore. Cleveland.
 Holmes, Samuel. New York.
 Hutchinson & Co. Cleveland.
 Keith, J. G. & Co. Chicago.
 Miller, Bull & Knowlton. New York.
 Mitchell & Co. Cleveland.
 Myers, James A. Chicago.
 Pauly, H. J. Milwaukee.
 Richardson, W. C. Cleveland.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. Buffalo.
 Sprague Electric Co. New York.
 Sturtevant Co., B. F. Boston.

WIRE ROPE.

American Steel & Wire Co. Chicago.
 Baker, H. H. & Co. Buffalo.
 Roebling's Sons, John A. New York and Cleveland.
 Upson-Walton Co. Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Crosby Steam Gauge & Valve Co. Boston.

WINDLASSES.

American Ship Windlass Co. Providence, R. I.
 American Ship Building Co. Cleveland.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.

WINCHES.

American Ship Windlass Co. Providence, R. I.
 Hyde Windlass Co. Bath, Me.

WOOD WORKING MACHINERY.

Woods Machine Co., S. A. So. Boston.

WORM GEARING.

Morse, Williams & Co. Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
 Playfair's Barge & Tug Line. Midland, Ont.
 Salvage Association of No. America. Chicago.
 Swain Wrecking Co. Detroit.

YACHT SAILS, FITTINGS, HARDWARE, ETC.

Wilson & Silsby. Boston.
 See also ship chandlers.

YACHT AND BOAT BUILDERS.

Dreйн, Thos. & Son. Wilmington, Del.
 Electric Boat Co. New York.
 Gas Engine & Power Co. New York.
 Lane & DeGroot. Brooklyn.

YAWLS.

Dreйн, Thos. & Son. Wilmington, Del.
 Lane & DeGroot. Brooklyn.

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No. 28, New York & Boston Exp..	*7 40 am		*8 00 am
No. 32, Fast Mail	*11 20 am		*11 25 am
No. 44, Accom. via Sandusky.....	†1 15 pm	
No. 46, Southwestern Express		*3 00 pm
No. 6, Limited Fast Mail.....	*5 40 pm		*5 45 pm
No. 10, C., N. Y. & Boston Special	*7 35 pm		*7 40 pm
No. 2 Day Express	†9 10 pm		†9 35 pm
No. 126, Norwalk Accommodation..	†7 55 am	
No. 40, Tol. & Buff. Ac., v. Norw'k	†10 00 am		†10 30 am
No. 116, Conneaut Accommodation.		†4 30 pm
Westward:—		Arrive from East.	Depart West.
No. 11, Southwestern Limited.....	*3 20 am	
No. 15, N. Y., Bos. & Chi. Spl.....	*3 55 am		*4 05 am
No. 7, Day Express		†6 30 am
No. 19, The Lake Shore Ltd.....	*7 45 am		*7 50 am
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No. 37, Pacific Express	*6 35 pm		*7 00 pm
No. 3, Fast Mail Limited.....	*10 50 pm		*10 55 pm

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—FOR SALE OR RENT—Docks, warehouse and manufacturing site; also sand pump, anchors, steam derrick and chain; all at Chicago. Address Wallace Bros., Detroit, Mich. April 19.

—FOR SALE—New Era gas engine, 35 horse power, latest type. Bought for emergency and used only six weeks. A bargain for someone. Address Cleveland Punch & Shear Works Co., Cleveland, O. Apr. 19.

—FOR SALE—Interest in patent (No. 639,079) apparatus for cleaning ships' bottoms (automatic). To be used while vessel is proceeding on voyage. Copy of patent free. Special favorable offers to first few applicants. B. S. Miles, patentee, Gray's Summit, Mo. June 14.

—FOR SALE—Tug Henry. Wood hull, 60 feet length, 15 feet beam. Single engine, 16x18 inches. Boiler 10½ feet long, 78 inches diameter. C. H. Strong & Son, No. 623 Cuyahoga Bldg., Cleveland. April 12

WANTED—A light-draught steam barge or canal boat to convert into a house boat; must be sound hull and cheap; speed no object. Address Box 35 Chicago Athletic Club, Chicago. April 19

—GAS ENGINES FOR SALE—Pierce upright of 1 h. p.; Pierce horizontal of 1 h. p.; Otto of 1 h. p.; one 7 h. p. Otto; one 10 h. p. Otto, gas or gasoline; one Fairbanks, 10 h. p., gasoline; also 20 h. p. Springfield, gas or gasoline. All replaced by Backus engines, the best built. Backus Gas Engine Co., 171 Lake St., Chicago. April 26

—FOR SALE—Scotch marine water-back boiler; 7 feet diameter, 11 feet long; dome 30x30 inches; furnace 40 inches diameter; 69 3-inch tubes, 8 feet 6 inches long. Built under government inspection and just completed. Price \$2,500. F. O. B. cars Minneapolis. Address Nicollect Island Boiler Works, Minneapolis, Minn. tf

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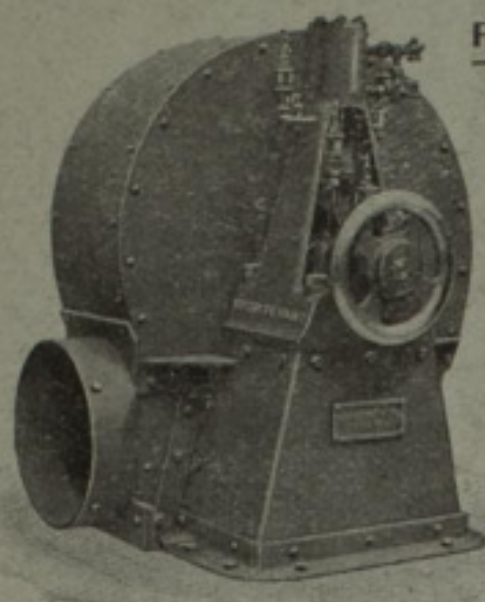
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(7)

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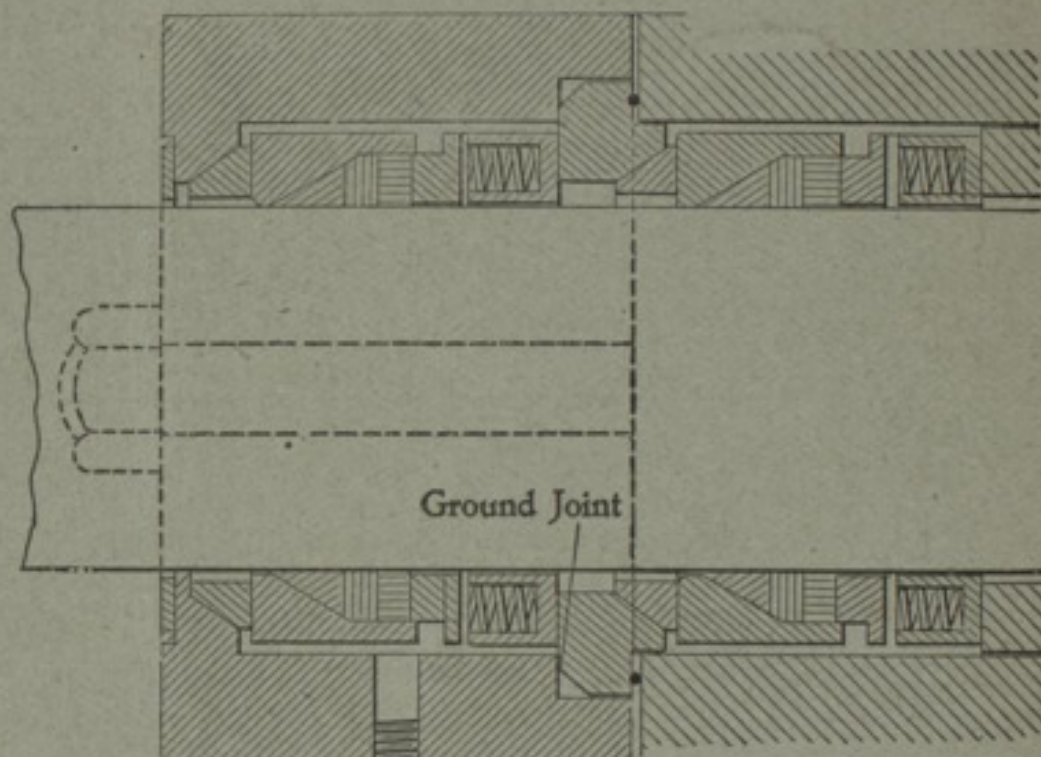
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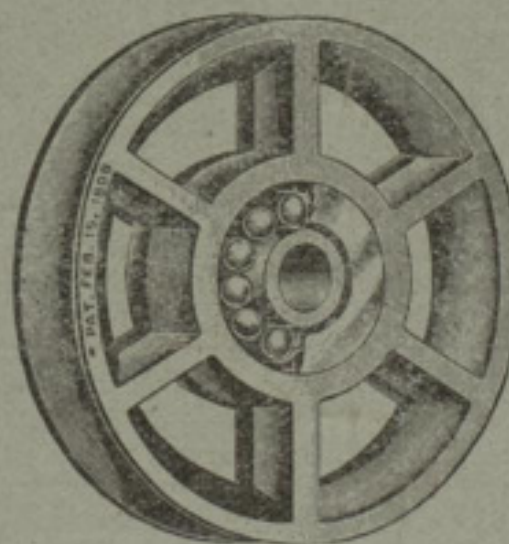
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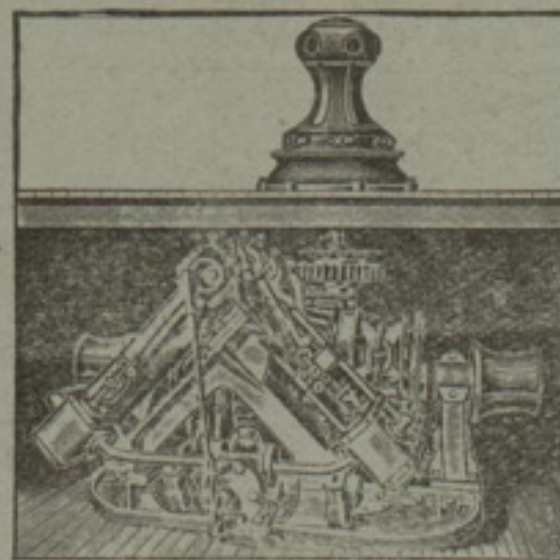
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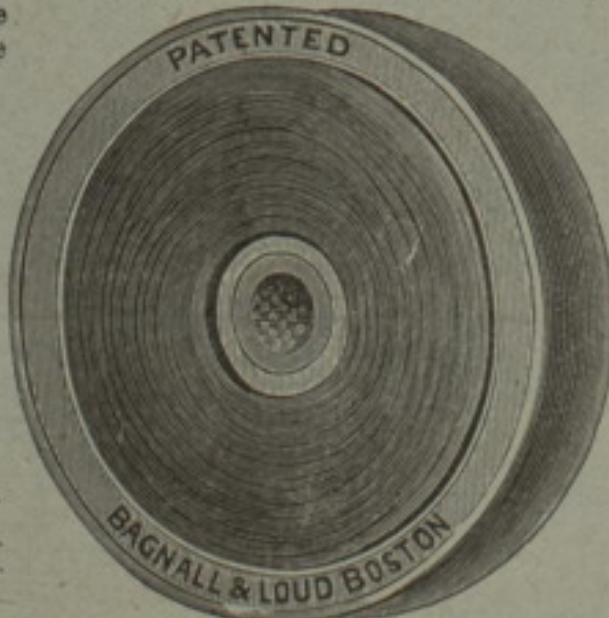
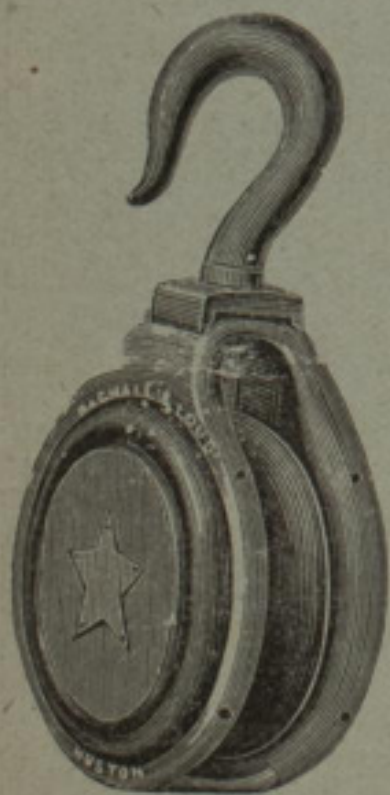
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VOL. XXI.

CLEVELAND, O., APRIL 12, 1900.

No. 15



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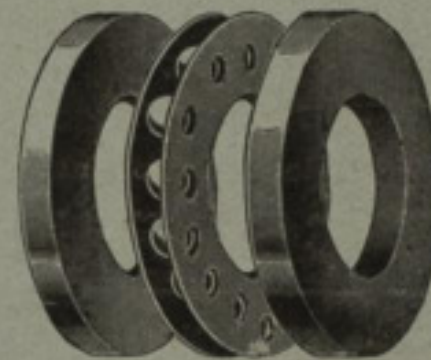
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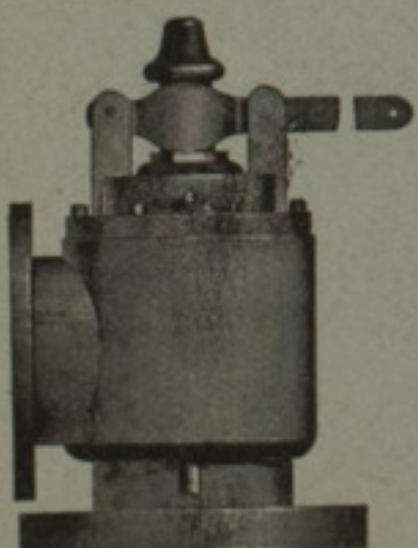
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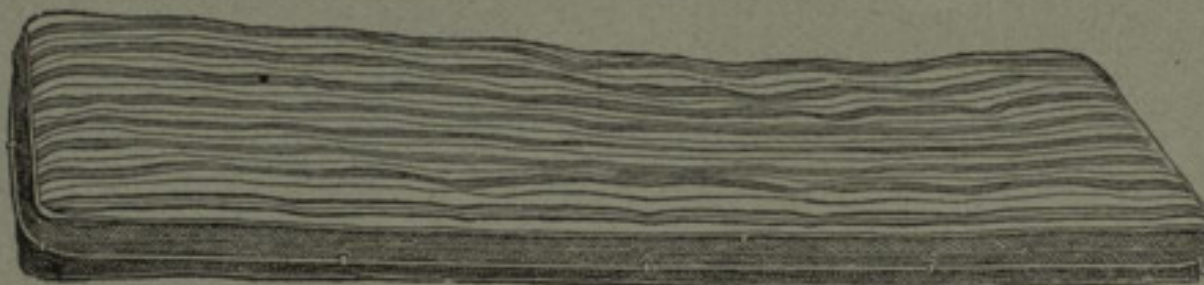
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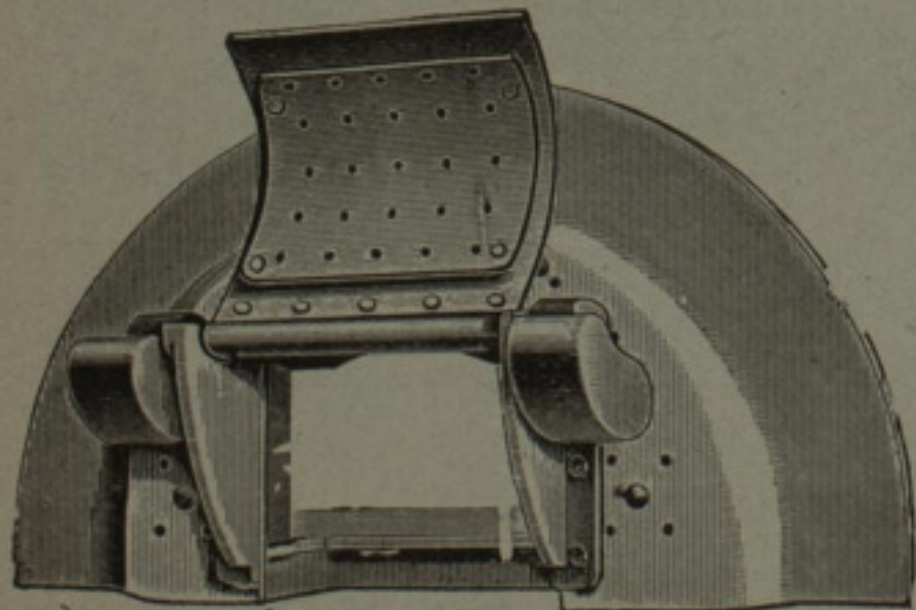
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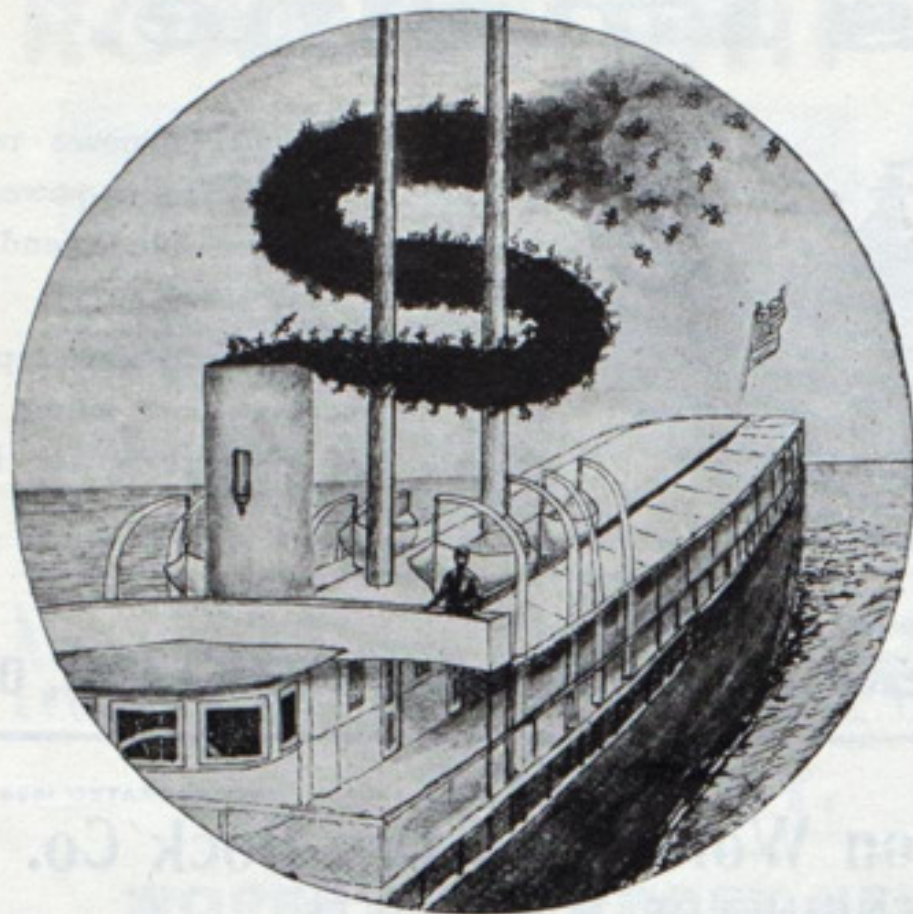
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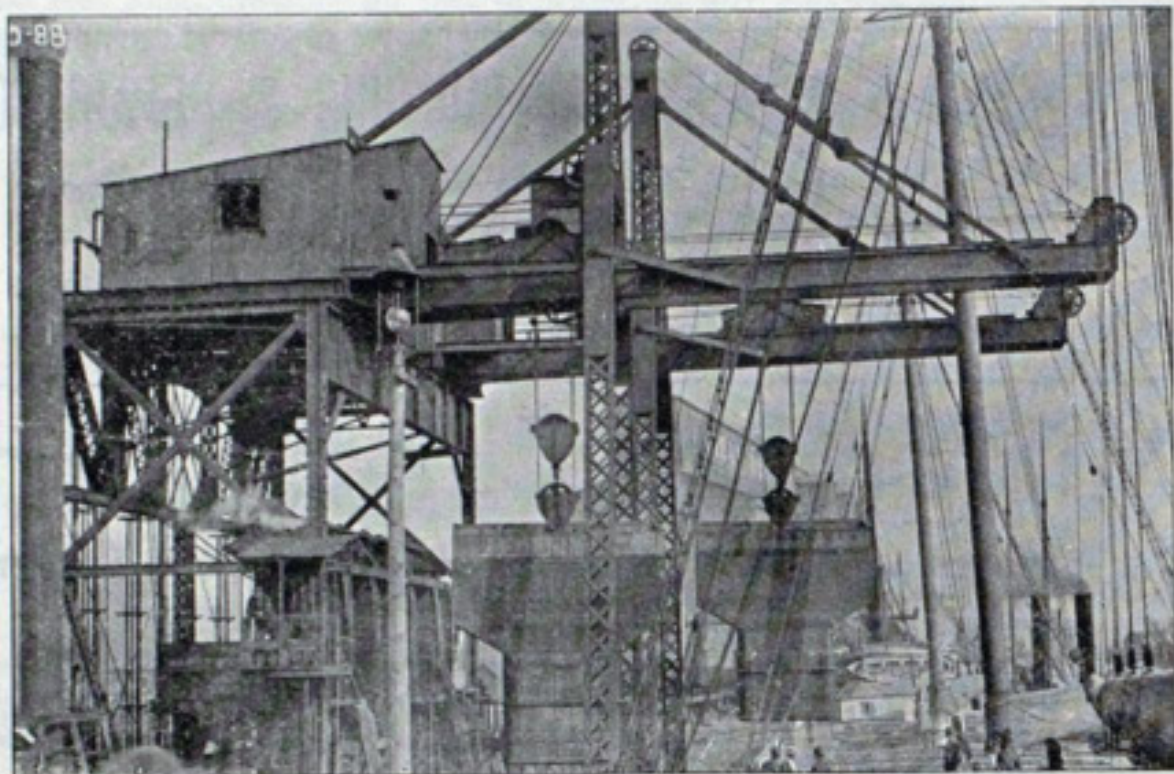
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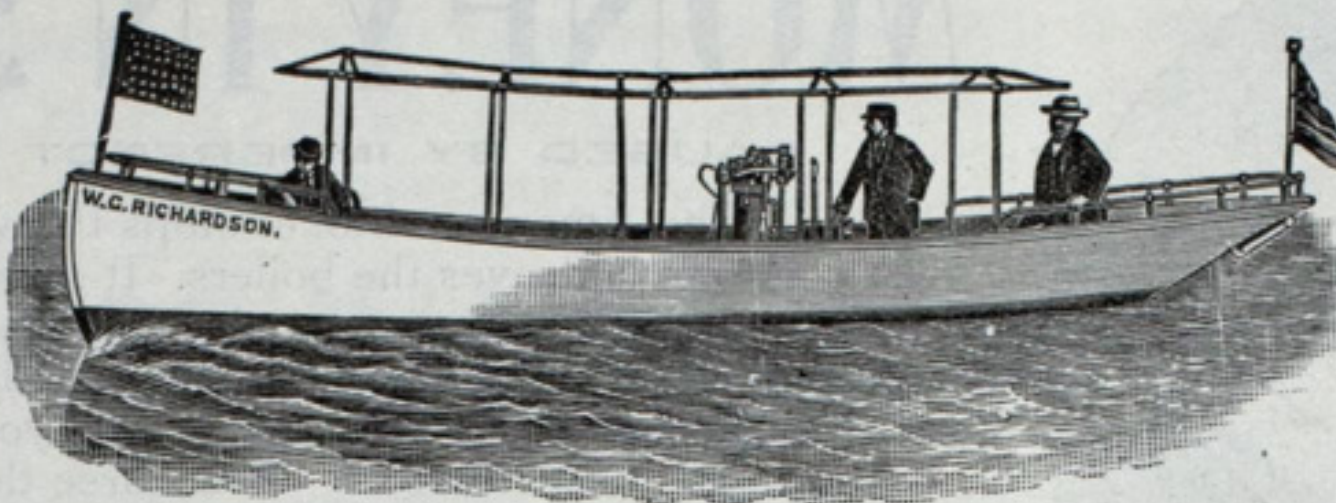
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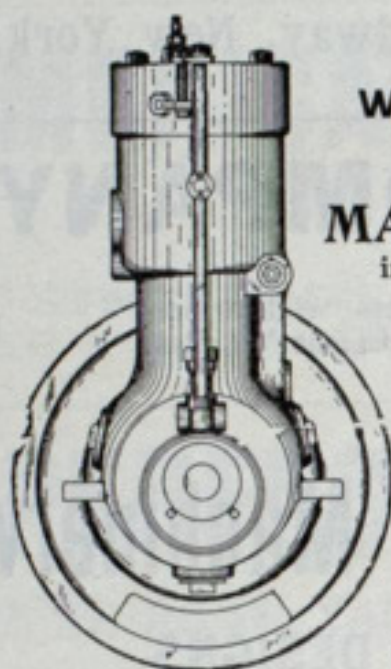
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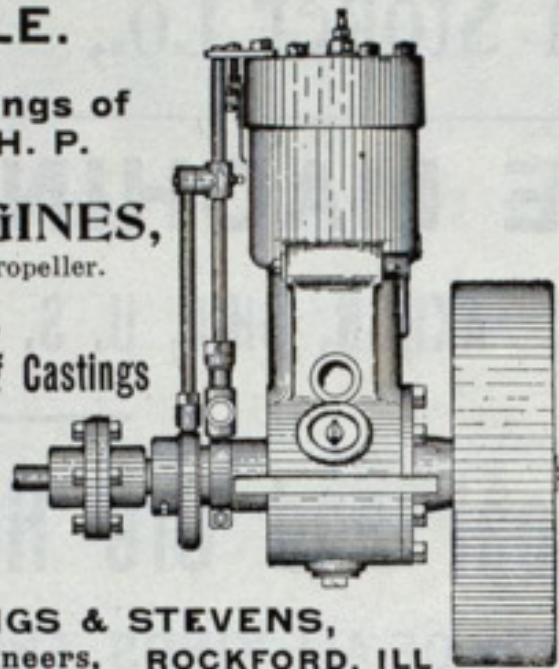
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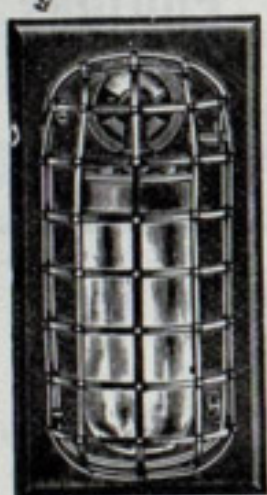
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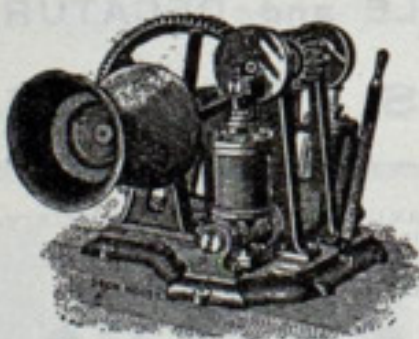
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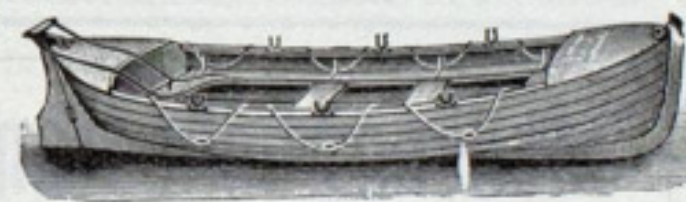
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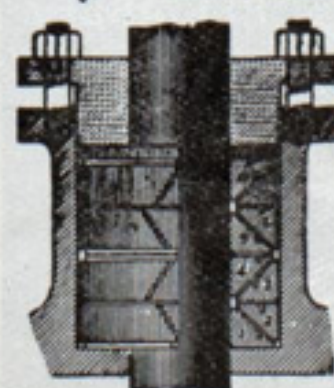


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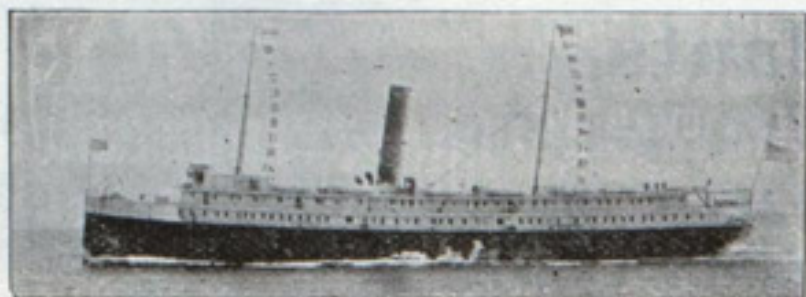
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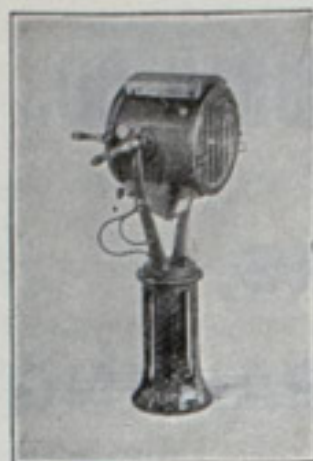
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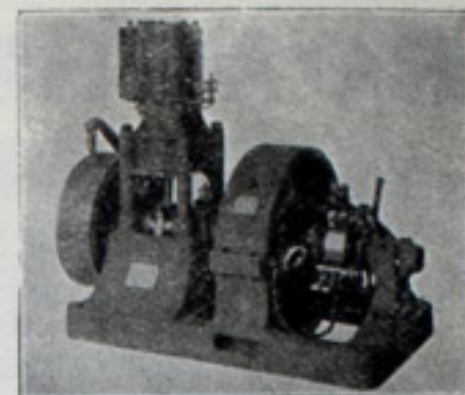
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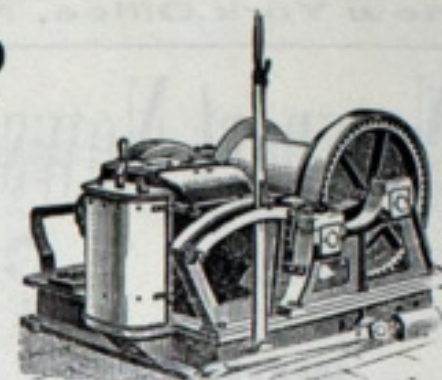
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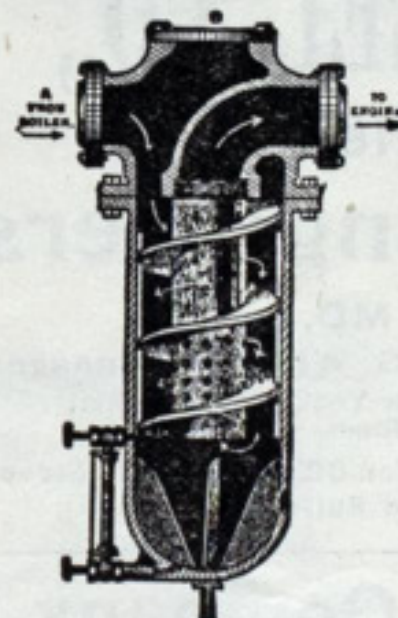
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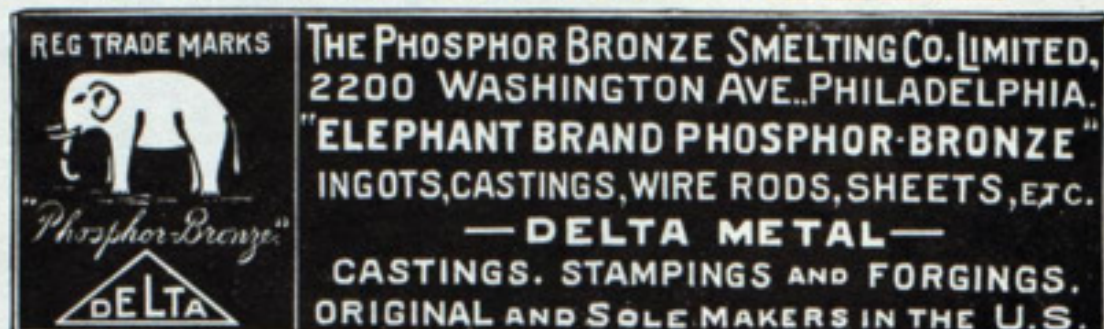
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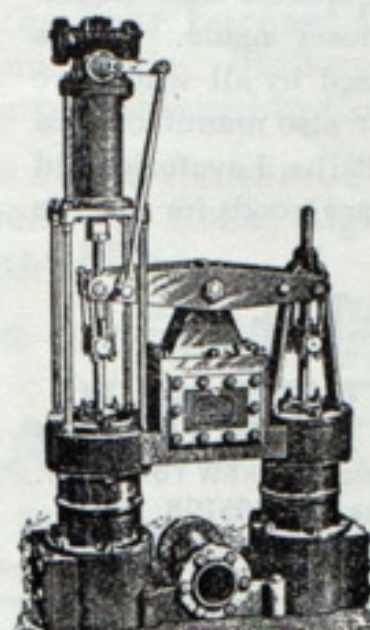
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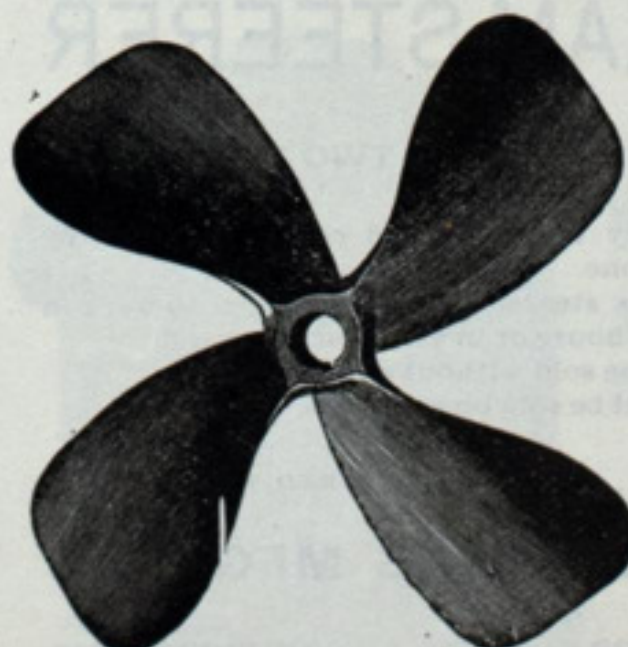
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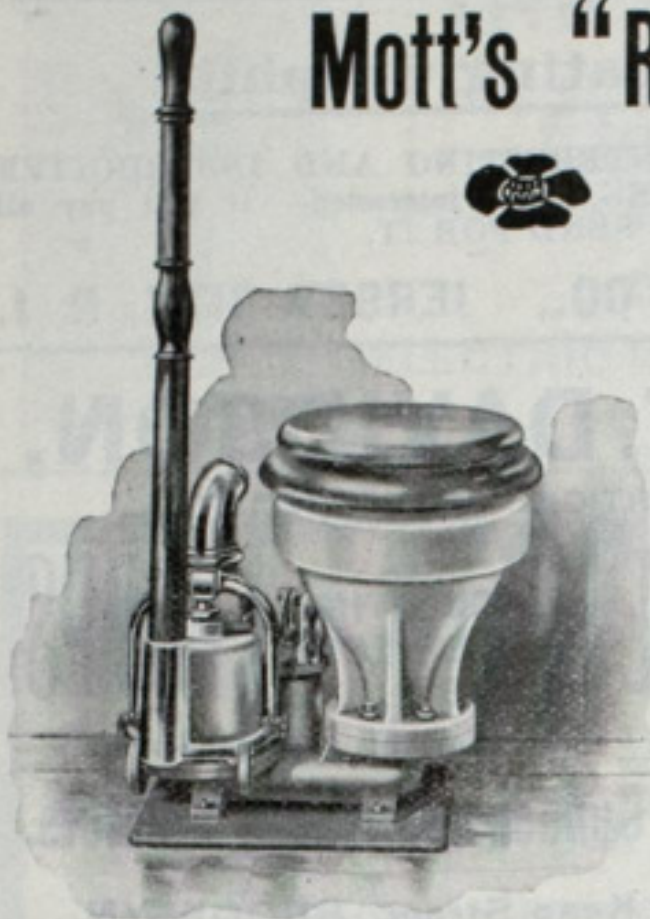
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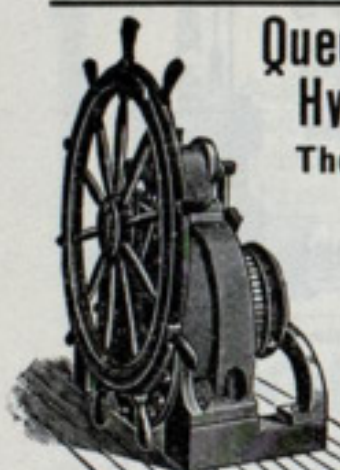
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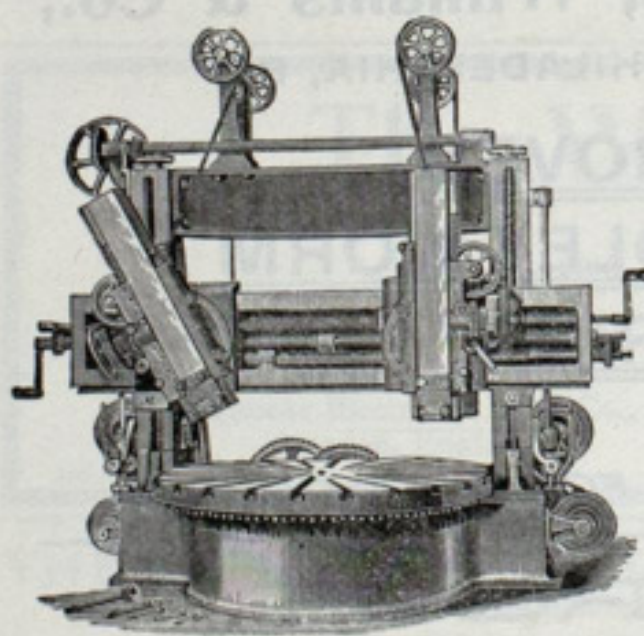
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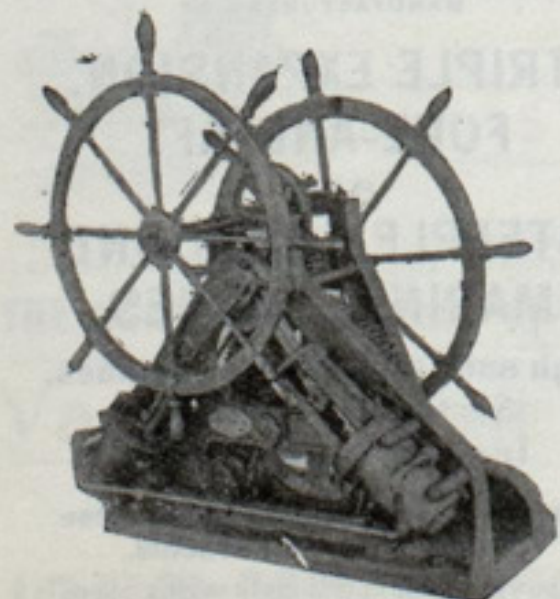
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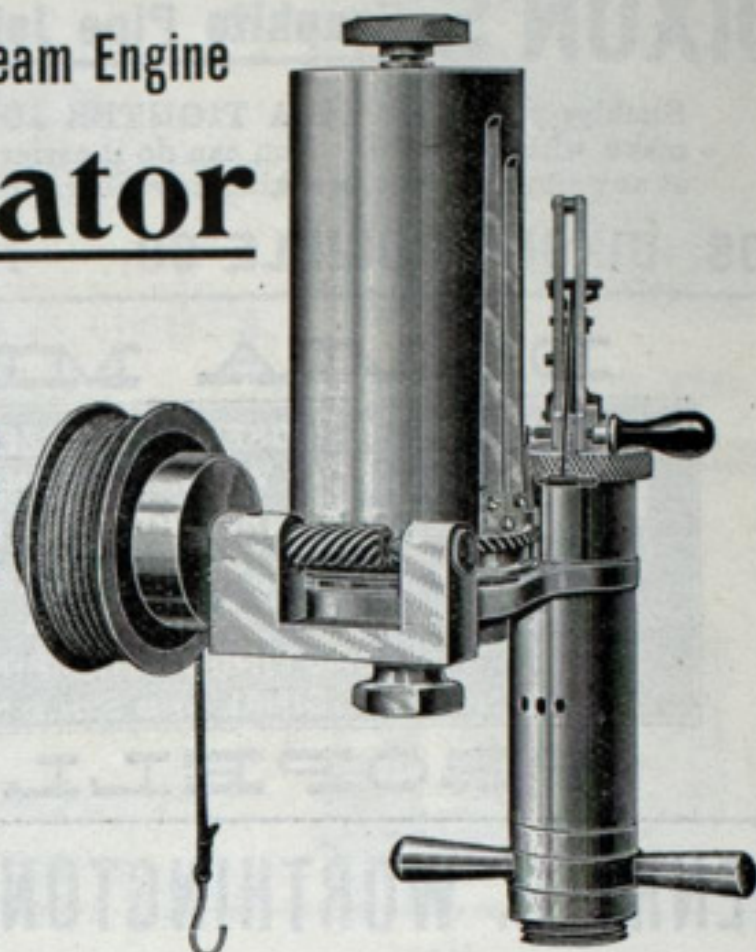
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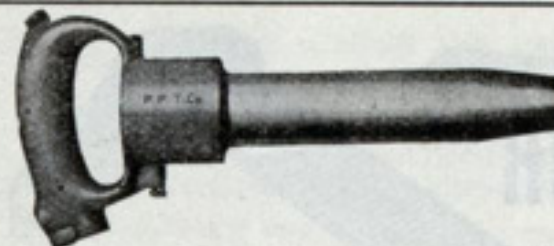
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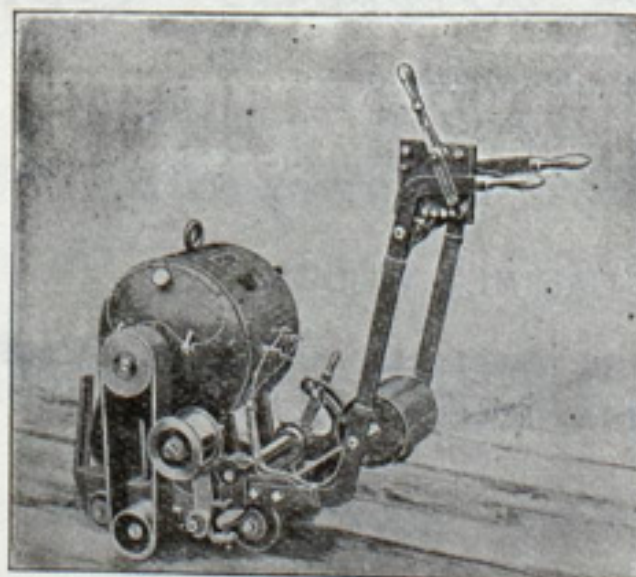


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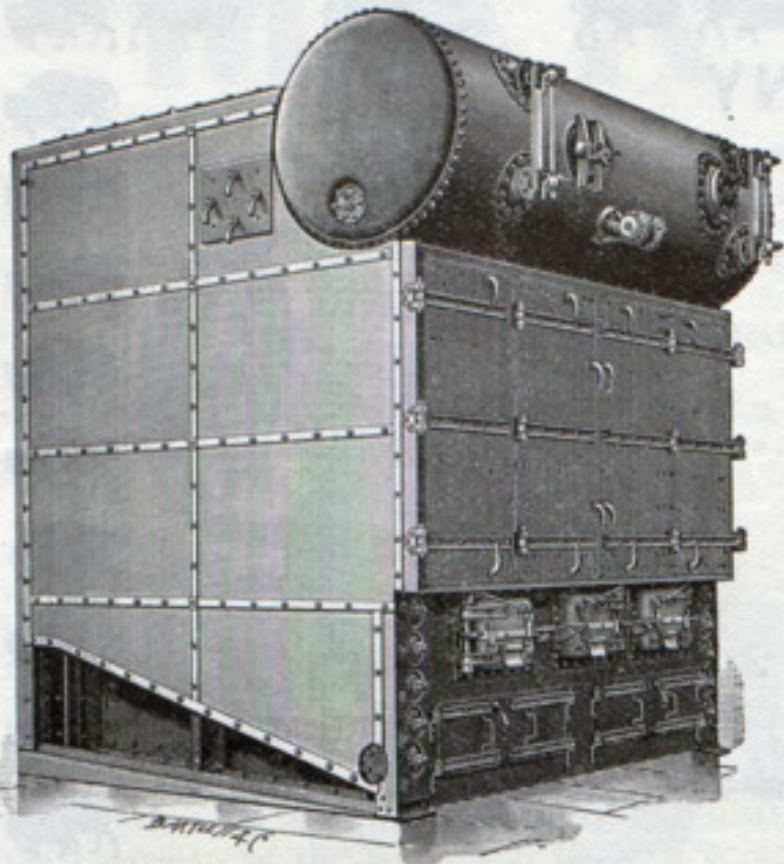
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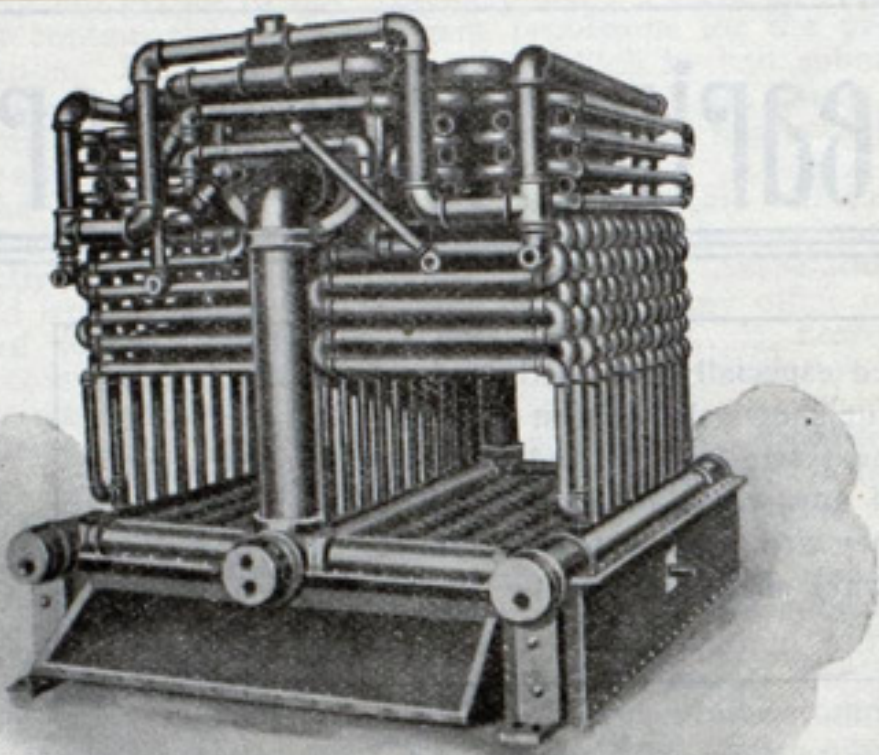
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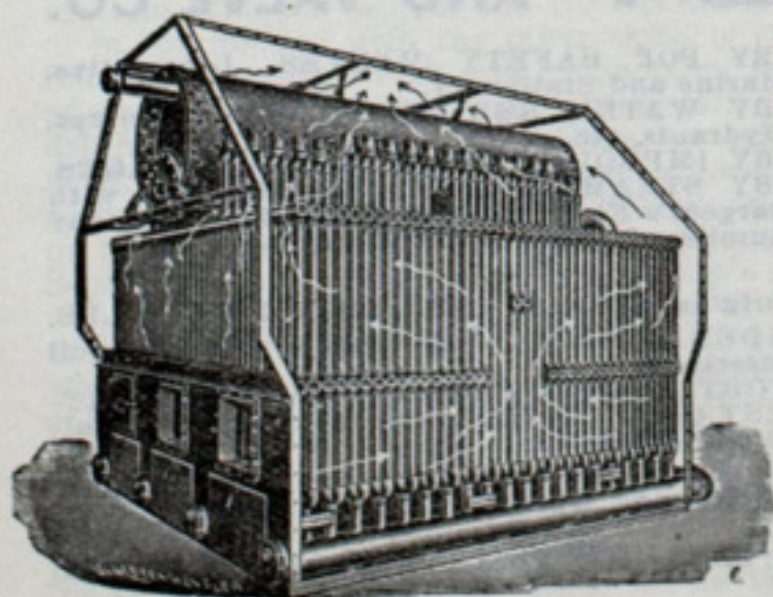
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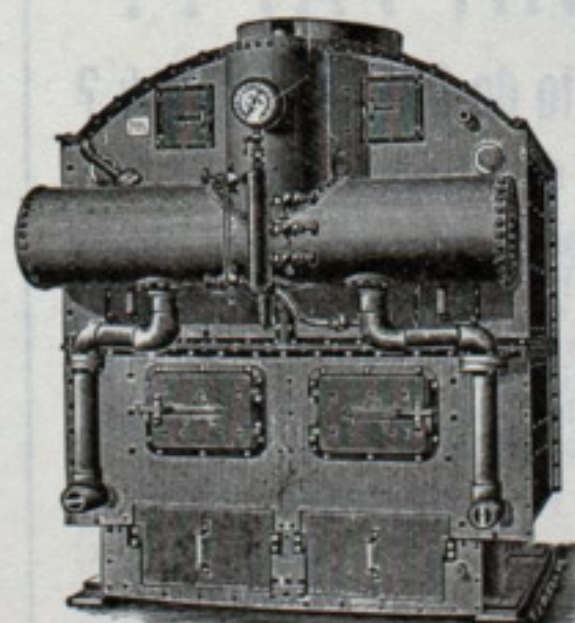
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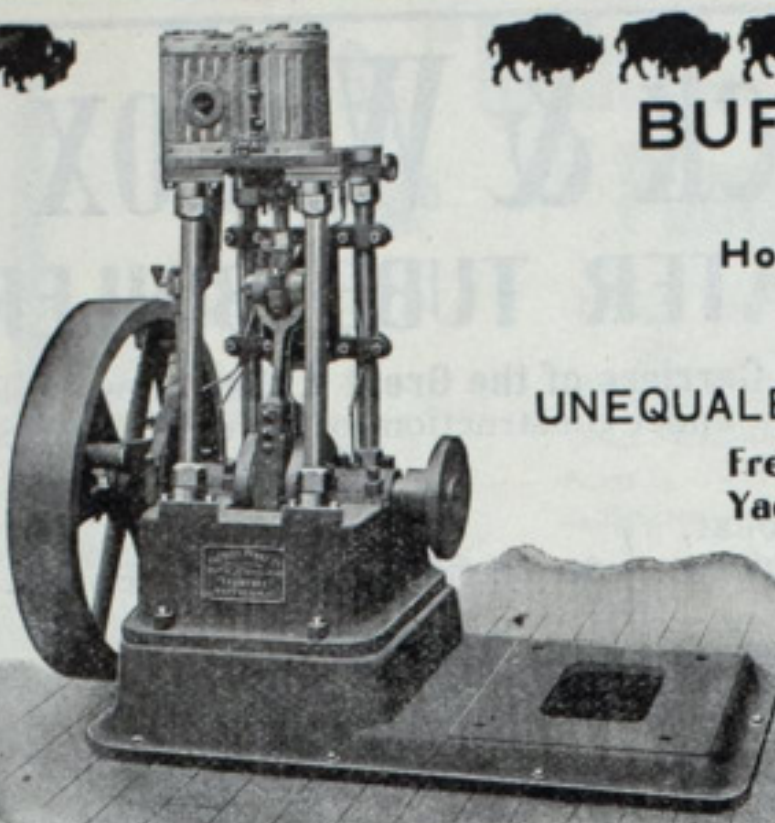
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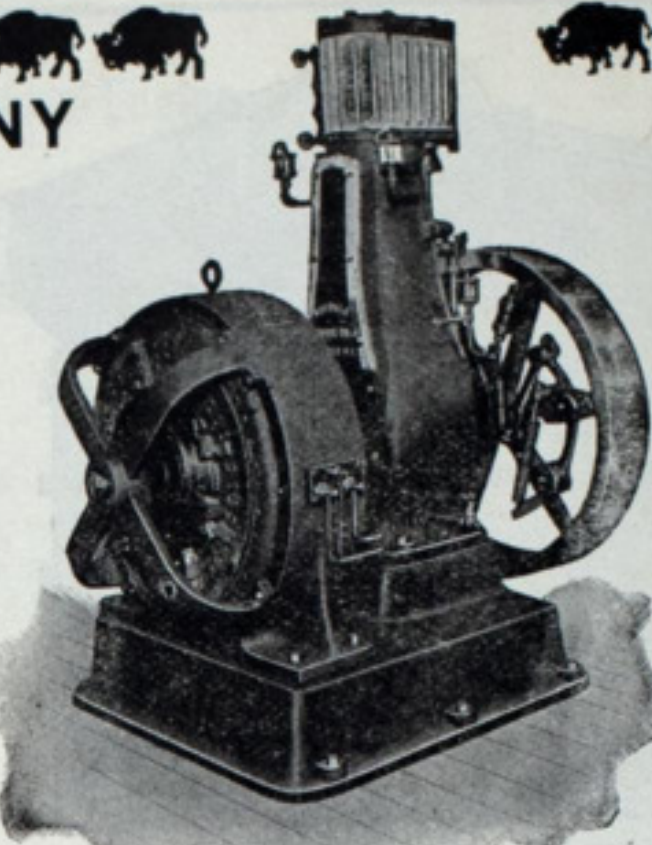
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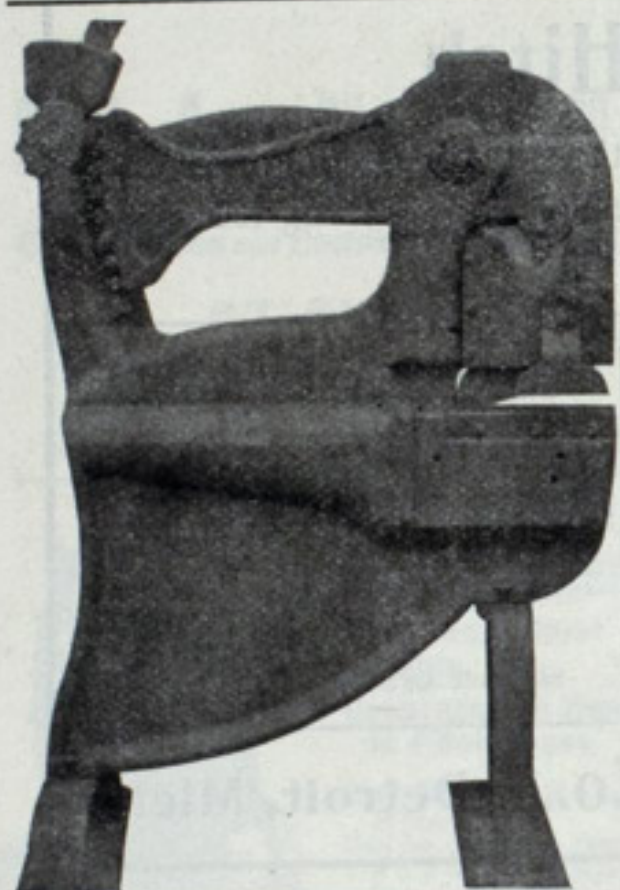


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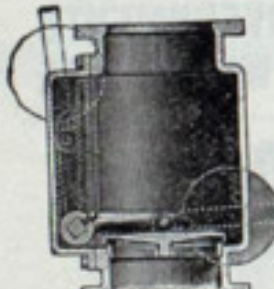


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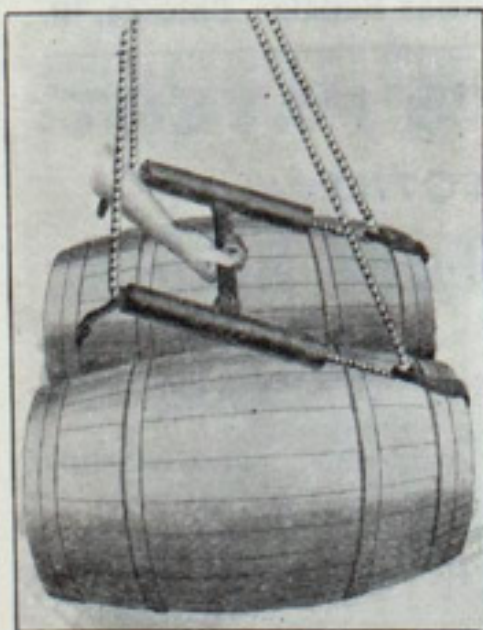
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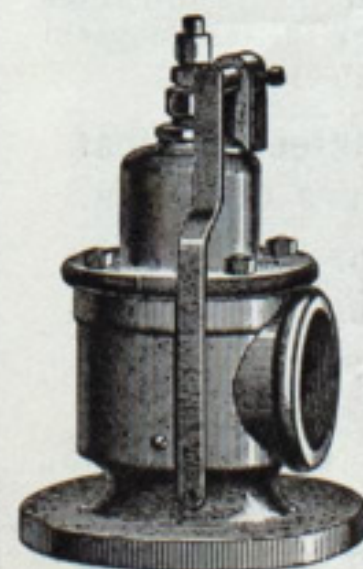
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